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Robert H. Bragg

AN ORAL HISTORY WITH ROBERT H. BRAGG

Interviews conducted by
Nadine Wilmot
in 2002

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Robert Bragg, c. 1978-81, photo courtesy of Lawrence Berkeley National Laboratory

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Interview History—Robert H. Bragg

Professor Robert H. “Pete” Bragg was born in 1919 in Jackson, Florida. He came to UC Berkeley in 1969 to serve as professor of material science and mineral engineering, one of six African American faculty on campus. His major areas of research were x-ray physics and applications to research on materials, electronic properties of carbon materials, and the mechanism of graphitization.

This interview follows his trajectory from his early life in Tennessee and Chicago, through military service, graduate school and early professional experiences in the private sector, and finally, on to Berkeley. At Berkeley he served as Faculty Assistant for Affirmative Action, an experience which this interview explores to shed light on the mechanisms and processes that were developed to combat informal discrimination in the academy.

All fourteen interviews took place at Professor Bragg’s home in Emeryville, California, June through August of 2002. In two instances, Bragg’s brother, McFarland (Johnny) Bragg, was also present at the interviews, though he did not participate for the most part. The interviews were recorded on minidisc and video. They were transcribed, reviewed by Professor Bragg, and lightly edited for readability and accuracy of names and dates. His clarifications can be seen in parentheses.

Professor Bragg was interviewed as part of the *African American Faculty and Senior Staff Oral History Project* series. This series of interviews explores the experiences of African American faculty and senior staff at UC Berkeley as part of the broader history of the University of California and its commitment to access and diversity.

This series is grounded in the premise that higher education is one of the primary strategies for gaining social equality—access to employment and income—for historically disadvantaged communities. Moreover, the University, comprised of its students and faculty and administration, with all of its intellectual and financial resources operates as a critical touchstone in processes of systemic social change. Therefore the university functions not simply as an educational institution, but also as a significant site of past and future potential for imagining and crafting opportunity for ethnic and racial groups formerly excluded from higher education. This project recognizes that the University of California, as California’s premier public educational institution, plays a significant role in the socio-economic mobility of all of California’s residents. The story that we hope will emerge from this project is a story of California—its people and one of its most important public institutions.

This interview was conducted under the auspices of the Regional Oral History Office. The Regional Oral History Office was established in 1954 to augment through recorded oral interviews the Library’s materials on the history of California and the West. Copies of all interviews are available for research use in the Bancroft Library and in the UCLA Department of Special Collections. The office is under the direction of Richard Cándida Smith, Director and the administrative direction of Charles B. Faulhaber, James D. Hart Director of the Bancroft Library, University of California, Berkeley.

Nadine Wilmot, Interviewer/Editor
Regional Oral History Office
Berkeley, California
July, 2004

Interview 1: June 20, 2002

Wilmot: Good morning, Professor Bragg.

Bragg: Good morning.

Wilmot: How are you doing today?

Bragg: Well, doing fine, and glad to be up and about.

Wilmot: Great. Today is June 20th, and we're here for our first interview.

Bragg: Fine.

Wilmot: You're Professor Robert H. Bragg.

Bragg: Correct.

Wilmot: Okay.

Bragg: H is for Henry.

Wilmot: H stands for Henry? Okay.

Bragg: Actually, I'm the second. My father's name was Robert Henry Bragg, too.

Wilmot: Okay. To begin, could you tell me when you were born?

Bragg: Born in—well, August 11th, 1919, in Jacksonville, Florida, U.S.A. Second child of four. My parents were Robert Henry Bragg and Lily Camille MacFarland—he, from rural Collierville, Tennessee; she, from urban Memphis, Tennessee. But they moved to Florida, where he at one time worked as a Pullman porter on the railroad, and I guess in those days that was kind of an exotic job. You got to travel. We're talking about early 1900s, teens. And I suppose Jacksonville was kind of a terminus. I don't know that—. But that's where they set up housekeeping, where my older sister—there were four of us: my older sister, Alberta [Bragg]; myself, the second; another sister, Nadine [Bragg]; and my brother, who just left [the apartment], Johnny [Bragg]. The three of us were born in Jacksonville. My brother was born in a smaller town, Green Cove Springs. So that's where I was born and spent the first four or five years, four years, I guess, of my life in and around Jacksonville, Florida.

Wilmot: Do you have any memories of that place?

Bragg: Not very good ones. This is eighty-two years ago. But some, by virtue of the fact that once you are reminded of them, they become a part of your memory by virtue of you remembered that you were told that and so on, so—. Jacksonville itself, really no. My only impression of that is what I saw years later. I happened to go back to the University of Florida to give a speech, and I had to go through Jacksonville to take another plane or somehow get to Gainesville, where the University of Florida is.

My mother was still alive then, and she had maintained contact with some of the older people in that neighborhood where I was born and told me to go and look them up. So I actually was able to do that. Part of the street was still there, although a freeway was just about to take it over! But it was little frame houses with a dusty road, and I guess that's the way people lived back then. But I had no recollection of that, even dim ones.

When we moved from there to Green Cove Springs, which is, oh, fifteen to twenty miles or so inland from Jacksonville, maybe a little more—but anyway, it's not very far. It's an area that has fresh water, and right now I think the U.S. Navy warehouses ships in fresh water so that the ships won't rust.

But that's not what we were there for. We were there because I guess my father decided that we should give up the restaurant business that they had and go and homestead. The idea was you—the Homestead Act provides for people to get public lands and become owners of it if you stay on it and you improve it and so on.

So we were homesteading, obviously, but although his parents were farmers, he (my father) was partially college educated—he had several years of college education, hardly a guy who wanted to be a farmer. But his idea was to haul produce from the farms in that area to Jacksonville and to haul staples from Jacksonville to the farmers, and make money both ways.

About all I remember of that was being out in the fields watching people crush sugar cane. Somehow that stuck in my memory. Also cutting sugar cane and chewing it. It's—well, if you've ever been in an area, a tropical area where sugar cane is grown, it looks like corn when it's growing, but it's sweet. You cut it and you chew it. It's a nice taste.

But what they were doing was crushing the sugar cane, crushing the juice out of the sugar cane. It consists of a mill, this was a stone mill. There was a mule that walked around in a circle that turned it, almost like a primitive, something almost primitive. I suppose it's done that way some places in the world today, for that matter. But you send in the stalks of cane, and juice comes out and drips into a barrel, and they collect it, and it goes and it's refined and so on.

I remember a little bit of that. Also that when they boil it, there's a green scum that seems to come over it. How I remember this, I don't know, except that they put this scum in a barrel, and it ferments and becomes alcohol. And so it was quite common for people to, men to sit next to this barrel and swill this, like, beer. You can get drunk on it.

The slang that I remember hearing in Chicago from people—I don't know how they knew it—they called it sugar-barrel high.

Wilmot: What did you say?

Bragg: Sugar-barrel high. It's from the fermented sugar. Incidentally, you can make liquor from sugar, from raisins or whatever. Anyway, that's about all I remember from Green Cove Springs.

Wilmot: I just want to go back a little bit before we start to take off. In the outline it says that there was a midwife at your birth?

Bragg: Yes.

Wilmot: Did your mother tell you that?

Bragg: Yes. I guess she did, but I also knew it from my birth certificate. I don't think any of us, even including my brother, who's the youngest, were born in a hospital. We were all delivered by—it was very common in those days. We're talking about 1917 to 1922, '23, something like that. So delivery by midwife was the common mode. Understand, now, compared to what we see today, in the areas we were living in, well, most people didn't have electricity or running water in the house—you know, indoor plumbing. And most people never saw a doctor except on the point of some very serious malady.

For example, I think I burned my hand. I know this only from my mother having told me. It was a severe burn, and she took me by train to Bradenton, Florida, which is on the west coast of Florida, Bradenton, B-r-a-d-e-n-t-o-n, Bradenton—to go to a doctor. There was no doctor in the place where we lived.

So, being delivered by a midwife was—that's the way you came. And they would sign the birth certificate, more or less. I'm not sure whether they were licensed or not, but they must have been approved by the Board of Health. That's the way it happened.

But I even had a friend whose daughter lived in Santa Rosa, who was college educated. She was a midwife. There was a movement afoot to bring back the delivery at home by midwives. And unless there's some difficulty with the birth, my understanding is the doctor can't do any more than a midwife can. It's only if you have a complicated birth that—that's when you need a doctor and a hospital.

Wilmot: Certainly for some people, it's their preference.

Bragg: Yes.

Wilmot: I wanted to return now—you were telling me about your memories about Green Cove Springs. And I was wondering, you were homesteading, did your family successfully set up the homestead?

Bragg: I don't think so. I don't know any of the details, but I know that that didn't last very long because my next recollection, which is much longer, is of being in this lumber camp or pine camp.

Wilmot: Pine camp?

Bragg: So it (homesteading) must have been a very unsuccessful operation. I have no idea why it failed. It may be that his expectations were rosier than the reality was. And also think about the time frame. I was born in 1919. World War I ended in 1918. Now, I'm under the impression that my father had become a ship's chandler. A chandler is like a store—stockroom.

Wilmot: Is chandler spelled c-h-a-n-d-l-e-r?

Bragg: I think. If you look it up, you'll find it. Basically, that's what it is: ship stores. The ship comes to port, has to put in supplies, and they go to the stockroom. People fill out orders, and they get filled. There's nothing grandiose about it, except in 1918 or thereabouts, this was practically a white-collar job. You know, it's a blue-collar job, but it's not farming; it's not laboring and whatnot.

But my point is that the homesteading must have been not particularly rewarding; otherwise, again, I can't imagine why we had wound up—and to this day I don't know the answer, why we wound up in a lumber camp. I know my father wasn't running a lumber camp; he was just out there with the rest of them, chopping down trees or whatever they did.

One day he brought me a pet alligator. They had killed the mother of this alligator, and brought me one of the young for a pet, so I had a pet alligator for a while. [laughs] He'd bite your finger.

Wilmot: How big did he get?

Bragg: Oh, not very big. We didn't stay there long enough for him to get very big.

Wilmot: Yes. From your outline, it looks like you were there just until you were about four years old.

Bragg: Yes. It was about that. It couldn't have been very long because the whole time span is only about four years. I don't remember my mother actually teaching me, although she wound up teaching in the little schoolhouse they had in this camp there.

Wilmot: Was she a schoolteacher?

Bragg: No, but she was, compared to the people who lived there, very highly educated. She had a high school education. In those days, illiteracy was rather more the rule than the exception, so for the purposes there, she was well prepared to teach the elementary grades. My impression is that I learned to read from the newspaper on the walls. These are just frame houses. Nothing fancy. What people did was to take newspapers and make a paste out of flour, flour and water, and use that as an adhesive for the glue, stick them on, cover up the holes, so the wind wouldn't blow through. And you couldn't see outside. So my mother tells me that I learned to read mainly by just having gotten started by reading the newspapers on the wall. [chuckles]

This camp—it was common of such places—had a—it was called a jook, j-o-o-k. You might find that spelled j-u-k-e nowadays. But what it is is basically a dance hall or a recreation hall, and on weekends, when the men weren't working, they would have musicians to come in and women, sporting women, they called them. The wives didn't go down there. The men sort of—well, they just sort of spent their money and danced and drank, and they got broke, then went home and beat their wives. [chuckles softly.] It's not funny. But that was the way things pretty much operated.

So women (wives) would get the guy who comes home. Now he's gassed, drunk. Some of them were violent; some of them were peaceful; but it was the thing that they liked least about life there.

But all I can remember about that was that my father had one friend who was a guitar player, and sometimes during the week he would come by and play the guitar. This one weekend, there was a big fight or something, and somebody broke his guitar, his nice guitar. There's nothing else about the story, except I remember the busted guitar.

My mother must have gotten real tired of this. I haven't said this, but her upbringing was urban. Her upbringing was urban. Her mother had gone to what was called Rust College then in Holly Springs, Mississippi. She had been a schoolteacher. So her mother was, for those times, fairly well educated. Had been a schoolteacher prior to her marriage. Married a man maybe ten years older, who had a daughter by a previous marriage. But the point was that he at that time was a postman, which in Memphis, Tennessee, in 1900 or thereabouts was a very rare phenomenon for a black person, so they were amongst the black bourgeoisie.

But now all of a sudden, here she is, reduced to living in a lumber camp with none of the amenities of urban life and apparently not going anywhere. So I guess in 1923 my brother had just been born, and my mother's family had never seen the youngest child, so I'm pretty sure, on the pretext of taking her newest child to see her family, she was, at the same time, leaving the camp. Because she never went back. That's the last time I saw my father until I saw him in a casket in 1939, I guess it was.

So that whole process, that whole phenomenon, that whole episode from birth to departure to Memphis covers about four years, and it was one of progressive reduction in status, you might say, until I guess my mother just had enough of it. Off we went to Memphis, where she had been born, where her family lived.

Wilmot: I have a question. What do you know of your father's family?

Bragg: A fair amount. I've done a little bit of the genealogical research, you can imagine. It's not too easy, because unless you were a freed black, you wouldn't appear on most written records except perhaps by first name on a slave manifest or something. But my father's father, Henry Bragg, was born in 1855 in Anniston, Alabama. He had a brother, Peter Bragg, who was four or five years older, also born there, presumably. That I know from a number of records and family lore.

But in terms of written records, the first place I see them is in 1880. Henry Bragg and Peter Bragg were on a farm in Collierville, Tennessee, which is a little town about ten or fifteen miles outside of Memphis, a country town. The census of 1890 was destroyed by fire, so it was kind of hard to trace what happened in between, but between 1880, when they were just hired hands on a farm, and 1900, Henry Bragg managed to marry and beget some children, buy a piece of land, and proceeded to—although they were country people, just about all the kids they had that could absorb it got to go to college. Which is strange.

He was a carpenter and was famous, rather well known for having built many of the structures around that town there. I guess because of that, he earned better than an

average living. He had Oliver, Robert, Aaron, George, Annie Laurie, Minnie, Halsey—I guess that's seven. They might have had some deaths in between there. It was quite common then. Not all kids survived.

But the oldest one, Oliver, went to Lane College in Tennessee. Subsequently went to Buffalo. Wound up as, well, the first black policeman in Buffalo, New York. My father went to Lane College. I don't think he graduated, but he did produce a half-brother, who I never saw. [chuckles]

Wilmot: A half-brother of yours.

Bragg: Yes. I'm sure he's dead by now. Well, maybe not, maybe not. [chuckles] Could be still alive. But he went to Lane College in Jacksonville. Uncle George, who I'll talk about later, went to Tennessee State, A&I State, in Nashville. Aunt Minnie went to LeMoyne College in Memphis. I guess there were three who didn't go to college. But imagine, now, we're talking about the early 1900s. From one family, that was rather remarkable. They were country people, but they were basically not—in a farming community, but they didn't farm. They either taught school or went off to the city and worked in factories or something. They were sort of big dogs in a little pond.

My grandfather was Uncle Henry. That's the way they spoke to him, spoke about him. And my grandmother, who was the sort of person who liked to run everything, Sister Mary.

Anyway, your question had to do with what I know about my father's family. I haven't been able to press further back, but the gist of what I've learned is what I've just said. Lots of intimate, minute details, but basically they either went to college and invariably either became teachers or civil servants, or they didn't go to college and worked—well, one worked for Ford and went to Detroit, in the automobile industry. And one aunt—well, she became a domestic. But the other aunt was a math teacher. They were all math teachers, incidentally. Every one of them was good at technical things. So I come by that kind of honestly. [laughs]

Wilmot: Yes. Is there someone in your family who you were told that you favor in terms of your looks or your temperament?

Bragg: No.

Wilmot: Was there anyone that told you, "You're just like So-and-so"?

Bragg: No, but it reminds me of something that used to kind of get my goat a little bit. These country people had ways that nowadays would be—most people wouldn't recognize them. For example, chewing tobacco or using snuff. Now, sure, the crown heads of France used snuff. That was all right, but once you got to be on the farm, it wasn't all right. [laughs] It's a rather foul practice. But they did it.

I can remember going out to the country to visit my relatives out there. The families didn't sit that close to each other. We weren't hostile, but not that closely allied. But to go out there, you'd meet somebody—everybody you met was your cousin. "You must

be Cousin Robert's boy." So I probably looked a little like my father, but, having no pictures of him, I don't know.

I don't look like the MacFarlands, on the other hand, who were basically much lighter skinned, and all the stuff that went with that. So the answer is I probably kind of resemble my father, but they had rather Negroid features, much more coarser than mine: thicker lips, you know, and broader nose, darker. I have a cousin who—I'm not sure who he looks like. Maybe he looks like his mother. [laughs]

Wilmot: When you describe the MacFarlands as lighter skinned and all the things that go with that, what do you mean?

Bragg: Well, there's a social phenomenon that goes with skin color, that persists to some extent even today. If you don't believe it, look at the women who are considered beautiful in the movies. You won't find too many coal-black females considered beautiful.

Wilmot: Right.

Bragg: They're going to look like Vanessa Williams, who could pass if she really had to. So even today—it's not as pronounced, of course. Black men—well, black women, too, can, in our society, even with our standards that are derived from white beauty, be considered white. Still there's been a place for—you have more chances to be considered attractive nowadays if you're dark skinned than before, but in those days, coming right out of—the Civil War hadn't been over very long, you understand.

The typical black person was illiterate, or only barely literate. People who would have had some opportunity to become educated and to accumulate wealth and status usually had—it was quite common, because of some interaction between a white man and black woman. So you have your mulatto class. Some of these (white) men, in their way, felt responsible for their children and would see that they were educated or they got a better shot in life than if they had been just plain black or not related to them.

You may be familiar with the current comedy of the descendants of Thomas Jefferson.

Wilmot: Yes. Sally Hemings.

Bragg: Sally Hemings was practically white, herself. The notion that she was a black woman is not true. I think she was half white herself, so that meant the descendants were even lighter skinned. But the point is that, coming back home, my mother's mother was half white, my grandmother, Sally MacFarland. Her maiden name was Sally Wilson. Her mother was in the census, recorded as a mulatto. Now, mulatto could have been black-white or Indian-white or Indian-black, so there were a number of kinds of mulattos back then. I don't remember her as being particularly light skinned, but I remember her having sharp features and long hair and being mean.

But anyway, I don't know how many half-white children she spawned, but at least one was my grandmother. And the reason I say that is that there were other uncles and things that I knew about or heard about but never saw, don't remember having seen them.

So Grandma Sally was half white. She married William Peter MacFarland, who has a very—I haven't been able to pin down too much about him except I mentioned he was a postman. But had come to Memphis earlier. He wasn't always a postman. He had come to Memphis around 1890 or thereabouts, and worked as some kind of laborer like that, which was quite common, or around a factory.

But he had coal-black hair, straight, and what ethnic mix he came from, I don't know, except that all their children were light skinned. Sooner or later I should be able to show you a picture of some of them. You'll see what I mean. There's a slang term that black people use, high yellow, which is a color lighter than yellow, and they were high yellows.

Being a postman, first of all he had to be bonded. In those days, the postmen carried money, did a delivery route. That meant that at that time he must have been involved in politics in some way because the postmasters appointed the postmen. I've had some correspondence with the Postal Service about this, and he pointed out that, well, he had to be substantial or thought so because he had to be bonded, and he had to be literate; otherwise, he couldn't read the post, so he at least was that.

He seems to have been a joiner, a guy who was very outgoing. Everybody liked him. Handsome. Good looking. Good personality. Joined everything. And so he'd married this schoolteacher, which was quite a thing. And so for a while they were probably amongst the black bourgeoisie of Memphis. All you need is one death to destroy all of that.

I think they had just about collected six children—I haven't counted them again, and he ups and dies in 1910. They were married around 1890, I think it was, so there was a period of—or maybe '92. So the oldest child is about coming out of high school. That was Wilson. And the youngest is an infant.

So all of a sudden, from middle-class status and all that, to suddenly have to care for six, seven children.

Wilmot: How did he die?

Bragg: You know, I don't know. I'm sure I do know, but I can probably find it. It wasn't very convenient! Probably a heart attack. My guess is that being so involved in what's going on, it's a high-stress kind of condition. I know my Uncle Teddy, who was one of his children, was hypertensive. Teddy'll come later.

Wilmot: Where was your mother in that series?

Bragg: I guess she was number two, because the oldest one was Wilson, who was very fair, very fair skinned; my mother, who was much lighter skinned than me, probably about your complexion, plus or minus; and then there was Virginia, Rebecca, and Teddy. There was one in there that was burned in a fire, and she died at a young age, working at an office somewhere and turned over a kerosene stove and burned up.

But to sum up, they were essentially part of the black bourgeoisie, but fell on hard times. What that did was to suddenly reduce the family fortunes to no fortune. I think

my grandfather, that grandfather had a small coal business which folded. I know he had it because I've seen that in the city records. But it folded. And now Grandmother not only has these children but she now has her mother, who was maybe fifteen years older. She had been a slave prior to—my Grandmother Sally was born in 1870, and slavery—the Civil War ended in 1865, and at my grandmother's birth, I think her mother was about fifteen or something like that, so she had been a child when slavery was abolished. Great-grandmother, Rebecca.

Well, I don't think she even could read and write, but she had taken her child from Virginia, where she had been born, to Holly Springs, Mississippi. Perhaps church related. It was a church-related school. It's called Rust College now. And she worked in the home of a rich lawyer, as a cook, and sent my grandmother to school. So that's how she happened to go to school. In those days, they called it college. By the time you'd gone that far, you'd come out and teach.

So Grandmother didn't go back to teach. She taught a few years before she married. But she didn't go back to teaching because after I got to the point where I was not afraid of her anymore [chuckles], I could ask her straight out, "How come you didn't go back to teaching?"

She said, "I didn't like children." [laughs]

Wilmot: Oh! You mean you were scared for a reason.

Bragg: Well, she was not one to bite her tongue. [laughs] "I didn't like children." I felt like saying, "Well, how come you had all those kids?" Well, in those days, of course, contraception was a little bit different than it is today. Women started having children, and they just had them until they ran out.

So the question was what did she do? She went to work as a companion to a rich old white woman in Memphis, and at first I wondered how that came about. Well, it turned out that her brother, one of her brothers, worked at a bank as a porter, and worked all his life, I think, as a porter. But he was I guess personable and whatnot, and the need for a companion to this rich old woman came up, and here's his sister, who needs a job. The lady doesn't need a housekeeper; she needs a companion. They're just that rich.

So what my grandmother did was essentially go around with this old lady, take her to the movies, read to her. This went on until she died. Her brother was the guy with the money. By that time, he was so used to having my grandmother around that he said, "Well, look, why don't you stay here and run my house?" So Grandmother then became the—she hired a cook and hired a butler and the chauffeur and all that, on the strength of—well, I guess the experience of having seen to this old lady.

My grandmother would go to the movies with her, for example, and in those days, the movies had two entrances. One was where the white people went in, and the other one was, depending on the size of the movie, the back entrance, where you went up to the top roost, and that's where the black people sat.

Well, Grandmother got to the point where she didn't feel like going up there. She wouldn't. Even if she wasn't with this old lady, she'd go and pass for—. Well, in the

South at that time, there were so many hues, believe me. It's quite an education. What you see in the movies is either black or white. But what you see down South is many shades of gray, believe me. [laughs]

I don't know how I got off on that, but anyway, I hope I answered your question.

Wilmot: I had a question. Did you ever go visit your grandmother at her place of work at that house?

Bragg: Well, yes. When we moved, when we came to Memphis, the house that we moved into was the house that my grandmother had been in when her husband died. At that time, of course, some years have passed. We came there, like, in 1923, and he had died in 1910, so a lot of things have happened meanwhile. But she's still living there. I suppose she owned it.

There was Great-grandmother; Grandmother, who only came sometime during the week when she was off; Uncle Teddy was still there; Aunt Rebecca was still there—she hadn't finished high school yet; and I think that was about it. Then my mother arrived with four of us, so all of a sudden the head count doubled. It's four—five rooms. But normally, Grandmother—I would only see her when she came by the house, not on her job.

But later, I think before I left to go to Chicago, I had occasion to go to where she worked. Some upscale white neighborhood where rich people lived. Interesting thing about that, though, is that when—this jumps. For a while, my brother—the time scale has changed here, but my brother went to live with my grandmother. Basically Grandmother is running the house for this retired white man who has nobody else in the house but him and his servants, and so there's plenty of room.

My brother wanted to go to a particular high school in Memphis, so to put him in the appropriate district, he went to live there with her, and so she got him a little job to help raise some money. This owner, this employer insisted that none of the servants use the back door. That was unusual. "No, you don't need the back door. You come through the front door." I guess—it was rather unusual. Anyway, I'd seen her in that setting. Basically she ran things there, and she ran things when she came home. Wherever she was, she ran things.

Wilmot: I'm wondering. You started talking a little bit about your mother coming back to Memphis with four children. I was just thinking that must have taken a lot of courage on her part.

Bragg: Yeah. Mama was one of a kind. Kind of a maverick in that she was, on one hand, not an aggressive person at all. Live and let live. Didn't envy you, what you had. And rather inclined not to be too acquisitive, but there was a point below which she just wouldn't go. So in that sense, I think—but what happened was that Mama decided this in Florida isn't really going anywhere, and so there's no point in staying in this.

Understand, when she left Memphis, she was part of the bourgeoisie, had a piano in the house. You know, she had years of piano lessons. Loved to play the piano. Hadn't had a piano since she got married. Well, nothing like that was forthcoming. So it was going

nowhere, and so—I'm thinking for her: Get out of that. They must have had a family conference and said, "Look, if you don't want to go back, you don't have to." So that led, in a way, to a kind of parceling out of—you could use the term breakup, but I wouldn't say really it was that. With all these children and never having done much in the way of working—my mother, I mean—she was a good seamstress, incidentally, a good designer and eventually went to work doing that to earn a living. But right now, she's got these four kids, and the youngest is a babe in arms and the oldest is, like, seven or eight. So what are we going to do with all these kids and a need for more money? Well, not too long after we arrived there—my older sister and I stayed with my mother in that house.

Wilmot: You and Nadine?

Bragg: No, me and Alberta. Nadine went to live with Aunt Rebecca. She was named for Great-grandmother, whose name was also Rebecca. My brother went to live with Aunt Virginia, who was a very aggressive type and lived in a nice part of north Memphis. So we kind of got split up. We were all in the same town, more or less, but living in different households. So, in a way, that eased the financial burden. It created other problems, of course. It's hard to be very close if you're not very close. Meanwhile, the Bragg side of the family, which lives in rural Collierville—

Wilmot: Collierville?

Bragg: The name of the town where my father was born and where my grandfather had come from Alabama.

Wilmot: Oh, okay.

Bragg: We'd go out there during the summertime, but they weren't terribly involved until—jumping ahead I got up to I guess the sixth grade in elementary school. Up to that time, we'd sort of go out during the summertime, but otherwise, there wasn't much interaction.

Well, basically Mama had had enough, and I think, she told me later—. Oh, I might add that at first I got correspondence from my father, letters. He left that camp and joined the merchant marine. He was a very adventuresome person. He would go to a fight, whereas most people would go from it. If there was going to be some excitement, he wanted to be around it. He was that type.

So I used to get letters from all over the world, wherever merchant seamen went. But Mama said that she would have gone back if he had come out, but since he didn't budge, she didn't budge, so that was it. They never divorced. She remarried the day after he was buried. She just didn't see much point in getting a divorce. There was no good reason for it. Divorces cost money then.

She wasn't very aggressive, but she did have, you might say, her drop-dead points. "No, you don't go any further than that. That's as far as you can go."

Wilmot: I'm wondering how they met.

Bragg: I've wondered about that. On the face of it, it doesn't seem to make much sense. I finally managed to kind of piece it together in doing this family history stuff. I was never told, of course. First of all, he would have been considered a fairly good catch, even despite all the negatives, being a rural person and although being dark skinned, because he had some education, college education, and he had had what must have been considered a fairly good job. Pullman porters led an exotic life. They traveled from place to place and observed the manners of the well-to-do.

It's like working in the post office in those days. It's just an ordinary clerical job, but for people who were basically domestics and laborers, it looks like a step up and it's a white-collar job. Even when I was in high school, being in the post office was still considered a good job, for black people.

So he would have been considered a fairly good catch, regardless. But how they would ever happen to meet—and the only way that I could figure that out was it was just coincidence. Where she was living—looking at where his siblings had lived in Memphis when they were going to school, or coming to work at jobs. There was one address not far from where my mother's house was, where they lived. And I figured that—you know, people didn't have cars too much then. They walked a lot, rode buggies. But he must have seen this beautiful woman and with his sweet talk and all that, that's probably how they met.

That's the only way I could account for it because there's nothing else. It's the easiest possible explanation. Just plain old proximity, along with acceptability.

Wilmot: Yes. Do you recall there being a tension between your parents' families?

Bragg: No.

Wilmot: They felt like they were on par with each other?

Bragg: You mean the families?

Wilmot: Yes.

Bragg: Let's put it this way: As a child, you're not privy to a lot of the subtleties, so a lot of stuff that's either said or done or thought, you're not aware of. I have the recollection that one of my brother's [father's] sisters was probably rather envious of my mother because she was pretty and educated and all that, whereas this particular sister was coarse.

Wilmot: One of your father's sisters, or your brother's?

Bragg: Yes, one of my father's sisters, the oldest one. She was kind of crude. Worked as a domestic for a while, then went to Detroit. I don't know what she did. Probably wound up in the automobile industry, where a lot of black people were. It's little things that I recall, things that were said or attitudes that were expressed.

They probably vacillated between let's call it marrying up and being happy to be associated, on the one hand, or feeling somehow this is good, or, at the same time, there

is a tendency for people to go off on people that they secretly are envious of, so I think there was a certain amount of envy.

The reason I say that is I can remember my Uncle George, who was the youngest son. I guess he was the youngest son, the schoolteacher, math teacher. Went to Tennessee State and married a woman who was very dark. Ordinarily, if I would have seen her in Nigeria, I would say she belonged there. And my grandmother couldn't stand her. She was too black. I couldn't see, what's that got to do with it? They weren't that different.

So I'm saying that there was a certain amount of, you know, looking back, an element of the color consciousness that played a role there. I don't see why Grandmother should ride this woman. She essentially broke it up. I don't know whether Uncle George had actually married her, but—. She came from a good family. They published sheet music, religious music in Nashville, which is a big religious center down there. And so, perfectly acceptable. She was college educated, too. But she was too black for my grandmother. So that tells you something, you know.

Wilmot: Yes, it does.

Bragg: Yes.

Wilmot: In thinking about your time in Tennessee or the beginning, when you moved there, you outlined the matriarchy at 817 Mosby.

Bragg: Yes. Well, that was—what I described is Great-grandmother, Grandmother, Uncle Teddy, and Aunt Rebecca. At one time, there had been in addition, Wilson, the oldest; Virginia, and Aline. They called her big sister because she was a few years older, a product of a previous marriage. They all had been in that house there. When I arrived there, of course, it was all being run by Grandmother, so that's why I call it a matriarchy.

It was an interesting life. It was certainly a step up from the way we had been living in Florida. There was a piano in the house. There were five rooms, rather, rather than two. The neighborhood itself was probably—. In looking over the way the city had grown, I dug into a lot of this stuff. The city limits at one time had been—this would have sat just outside the city limits. But by the time—it probably was an unincorporated area that they built into, one of the earliest houses in there. It was not like a development; it was a collection of disparate houses, different designs and so on. But right next to this one, out back of us, there was a kind of a small—not a deep valley but, like, a depression. They called it a bottom. Springs, water springs back there. Called Spring Bottom. And back there, there were kind of like slums. So by the time we arrived there, whatever little glory the neighborhood might have had is gone. Now it's on the point of becoming a slum, I think. There'd be shooting back there; there'd be cutting and gunfights. I remember one time a mad dog came through the yard and people came out, shooting. A policeman came through, shooting.

And we didn't associate with those people. About the only ones in the neighborhood we did associate with were the people who were friends of my mother's, who were the McCann children, who were half white. I eventually wound up in Catholic school with some of the youths, a few years later. And when I moved to Chicago, believe it or not, not too far from where my uncle lived, there was a saloon on the corner owned by the

father, the white father of these mixed-blood children. So I saw these McCanns again and again. [chuckles]

But that was 817 Mosby, and that's really where I became aware. I'm now in elementary school, which is within walking distance, Carnes Elementary School. Still there. I went through I guess three or four grades there. My mother had gone to school there, and her sister had gone to school there. Her family had gone to school there. So they were pretty well known. It hadn't been that long since—. There's still institutional memory, so we were expected to do well because they did well, and so—of course, I was able to do well, as well as my sister, so we wound up as teachers' pets.

That didn't help too much, though. Well, it did and it didn't. I must have made a good impression because I could draw fairly well by free hand sketches. I remember doing something in the second—I don't remember distinctly, but I remember there was an incident where I drew something, and it wound up being circulated around the school. I don't even remember what it was.

Other things, like, they'd have little plays. I could act a little bit, was kind of a ham.

But the two memories that stand out biggest were the principal, whose name was C.J. Neal, who was typical of the principals of that era, where you flogged children. Nobody said anything about it. If you were unruly, well, you were flogged. He had a long strap, about like this [demonstrates length]. Written on it was "Peace and Love." And he had holes cut in it. The idea was, presumably, that the sting that you felt when this thing hit you was sort of accentuated by the presence of these holes.

Well, one day—typically you would play in the schoolyard, and then a bell would ring or something and you would line up to march in. And once you lined up, you weren't supposed to talk. This particular day, I'm talking next to a friend. He (Mr. Neal) had this long coach whip, and he just sort of tapped us. That meant: 'Get out of the line.'

That meant you're almost sure to get a flogging, talking in line. So you march up. You stand on either side of the principal's door, his office. You wait there until he's ready to dispose of your case. You don't dare leave. You just stay there. After all, you're only seven or eight years old. You don't defy anything! [chuckles]

I remember my sister came down to the principal's office on some errand and saw me out in front of the office there and started crying because she knew I was going to get a whipping. Sure enough, he eventually came out. Marches us down to our homeroom and calls the teacher out. You know, all the kids inside were laughing. They know what's going to happen. [chuckles]

And he asked her about us. She didn't say a word in our defense, of course. So I remember I had a pair of suspenders holding up my trousers, so he grabs me by these suspenders and proceeds to flog me with this strap. He flogs the other guy, and we go in. Everybody is tickled pink that we got this whipping. [chuckles]

It took me years—it took me years before I felt like wearing suspenders again. There was something about associating the suspenders with—it had nothing to do with it, of

course, but it turned me against suspenders. It was God knows how many years before I felt like I could put them on.

And so when I told my parents, they went to school to see about it. They said, "Well, you should have just gotten up and gone out." From that point on—you know, nothing like that ever happened again, of course. But the point was that I was such a dutiful—the rule said you sit there unless you were let go, so I just sat there and peed on myself. And I'm saying that that's a character defect. The other incident was—I guess it speaks to a character defect. I had always been a sickly child and wet the bed. And so whenever the time came to pee, I would quickly go do it, hoping that I won't pee that night. Well, this particular day, I'm in the class and I have to go pee. Somehow, I can't get the teacher's attention, and rather than just go up and go out, I peed on myself.

Probably in my psyche, somewhere along the line, that same kind of—if not that particular—the same way of thinking, of response to authority that enabled, that permitted that to happen probably had some effect somewhere along the line in my career. Some place where a little more boldness was called for, I didn't have it. I don't know what it was, but I'll be willing to bet you that that has been a problem with my career. At some point where I should have been a little more aggressive or bold or did things or grabbed things, I didn't do it.

Wilmot: Well, there's always the fear of retribution and punishment.

Bragg: Yes, true! [laughs] But I'm saying that sometimes—let's put it this way—it's better to ask forgiveness than to ask permission. No, that's about right. If you're in a bureaucracy, the tendency, as with almost anything you want to do that's not standard, people will find a way—the easiest thing to do is say no. Just say no. There may not be any good reason to say no. It could mean some change which could violate anything. The safest answer is no.

But if you go ahead and do it and ask forgiveness, you're more likely to get forgiveness. In other words, the thing you wanted to do is more likely to be forgiven than permitted. I learned that from Rod Park, who was the vice chancellor at Berkeley, who was an interesting guy, too. I guess you weren't there when Park was there. Were you there when Mike Heyman? You came after Mike Heyman.

Wilmot: I believe so.

Bragg: Okay. Well, you wouldn't know about Park. Heyman was the chancellor. The vice chancellor was Rod Park, who literally ran the university. Mike was the guy, the outgoing personality that everybody loved, and Mike would give you whatever it is you wanted, and then when you go to collect it, Rod would take it back. [laughs] They made a great team.

Anyway, those are two incidents that stood out at Carnes Elementary School. I went from there to St. Anthony's, probably the fourth grade, I guess. We had converted to Catholicism. That's what brought that on. My mother and us, her children. In fact, other relatives as well somehow got swept in.

Wilmot: How do you think that happened, and what were you before?

Bragg: I'm not sure what we were before, and I'm not sure—all that I did, of course, was just go along with what I was told to do. What converted my mother, I don't know, unless it was the organ at the church. She loved playing the piano, and she learned the organ.

There's a certain amount of dignity and fanfare and stuff that goes with the Catholic ceremonies and whatnot. And it might have been that—I'm not sure whether there was a problem with the quality of the public school education or not, but there was also a class thing. Most of the black people who went to St. Anthony's were middle class. I don't recall any of them who were other than that. Some of them were fairly well-to-do. One of them, Dr. Hose, for example, must have had either a Cadillac or a big—in those days, cars had long engines. This thing was—it would be a museum piece. I'm sure it would be now.

But the point was it was such a big deal that when you saw him riding along in this car, you knew that this guy either was way in debt or he had a lot of money. And, of course, it turns out he had a lot of money.

Another one, an undertaker's son, went there. These are all middle-class, bourgeois black people. So that probably was something that prompted it. I think my Aunt Virginia was the leading figure in this, to get it going. She sang in the choir. She had married a guy who was a mechanic in the police department, which meant that he earned pretty good money. He eventually became the first black policeman in Memphis. But at that time, he had this job working as a mechanic, so he had money and he had a car and all that and was able to buy a house in a northern suburb.

I guess she felt—I don't know this, but it's better to be a Catholic than a Baptist or a Methodist. Why she didn't go to the Congregational church, I don't know, because that's what my grandmother did. But that's another matter.

At any rate, I went to St. Anthony's. St. Anthony had a segregated church. Black people sat on one side; white people sat on the other. Didn't mix. About the only thing unusual about it is they were actually in the same church, which was—well, that didn't happen in the Protestant churches.

I don't recall anything unusual about the academic program there except it was probably okay. The nuns were white. The teachers, the lay people were black, teachers. Priests were white. That was two years of that. Nothing really distinctive one way or the other, except going through baptism—are you Catholic?

Wilmot: No.

Bragg: No. Well, there's a succession of depth in terms of the faith. Catechism is essentially learning the ins and outs of what you're supposed to know. Baptism is the first part, which is just sprinkling. [demonstrates] Communion, next the sacrament, and the confirmation, which—I'm not sure exactly what it's supposed to signify, but at that point, you're solid all the way. You're about as Catholic as you're going to get. And that's administered by a bishop, who comes for confirmation day and all this. So I went through all of that.

I remember the Protestant children making fun of us because they said the nuns screwed. Had sex. I don't remember their saying anything about the priests, come to think of it. But essentially we were ten years old, 'That can't be. The nuns had sworn and all so that can't happen.' I don't recall ever actually getting into a fight about that, but, well, being very upset that anybody would make any accusations that that would be the case.

Two years of that. I don't know what brought about the change to go to Woodstock [Training School], but it may be that money is becoming more of a problem.

Wilmot: I have a question.

Bragg: Yes?

Wilmot: Were you an altar boy at all?

Bragg: No. My brother was. The only time I ever did anything like that is around Easter. There's a whole week of religious folderol that you put on the frock. I don't know exactly what you did, actually, but the altar boy you're talking about is who assists the priest at every mass. No, I never did that.

Wilmot: Were these Jesuits?

Bragg: I have no idea.

Wilmot: And are you still Catholic?

Bragg: I'm an ex-Catholic. A lo-o-ng time ago.

Wilmot: When did that happen for you?

Bragg: In 1933, '34, not too long after I came to Chicago. I came to Chicago a Catholic. Even after I went to a county school, where my uncle was a schoolteacher, I remained a Catholic. That, for two years. But when I came to Chicago in 1933, I went to a Catholic church. But by '35, World War II was coming along in Europe, and Mussolini is running over the Ethiopians. The Eritreans and whatnot.

And the pretext was bringing Christianity to the heathens. Well, by this time, I read [pronouncing it as present tense] a lot. Everything I could get my hands on, I read [pronouncing it as past tense]. Naturally, I'm curious about history and all that. I read that the Coptic church predated the Catholic church by quite a long time.

And since the Ethiopians were Coptics, I couldn't see why the Italians were taking religion to these heathens. It should have been the other way around. So I confronted the priest with this, and he gave me some kind of bullshit, which I knew was bullshit, and I lost respect for it.

By that time, I'm becoming essentially an atheist. I'm not any more. I'm an agnostic, just playing it safe. But—

You're supposed to laugh! That's funny! [laughs]

Wilmot: You have to understand that my religious background is such that sometimes I don't get jokes like that, that's all.

Bragg: Are you really deeply religious?

Wilmot: Oh, no. Not at all. In fact, I wasn't raised in any denomination at all.

Bragg: Okay.

Wilmot: And that's why it's, like, hard for me when you say agnostic, I'm like, okay.

Bragg: Well, agnostic is a person saying, "Well, I'm not sure." Basically, that's what an agnostic says. The atheist says, "No." And the believer says, "Yes." And the agnostic says, "I'm not sure." [Laughs] Well, I went from Yes to No to I'm not sure.

Wilmot: I understand.

Bragg: But the point was that I just thought it was just pure racism. We didn't have a word for it then, but they were picking on them because they were black, is what they were doing. They were Africans, and they wanted some more territory, some more glory, and that's what they were doing. It had nothing to do with religion. But to have the priest justify it and not take a stand was just—you know, it was just a sham, so I lost respect for them.

That essentially washed me out of the Catholic church. I was already becoming skeptical anyway, but that sort of helped put the nail in the coffin. I just stopped going, all the religious observances and—. My brother is still a Catholic, incidentally.

Wilmot: Your brother who I just met?

Bragg: Yes. But it didn't take for me. I sort of became irreligious. Not anti, but irreligious, if that's the right word. And the only time I ever got involved with the church in later times was out of a sense of responsibility. I'd go to church because there were girls there. But that wasn't for religion. [laughs] That was a practical place to meet nice people.

Wilmot: A different kind of religion.

Bragg: Yes, right! Well, you know, you're more likely to meet a nice girl in a church than in a bar, although I'm not sure I can justify that altogether. But it depends on which bar. [Laughs]

Wilmot: Yes. For sure. Interesting.

I was wondering about a couple of things about your community in Memphis, before we kind of move on. I'm wondering, like, when you think of that community, how would you describe it? You have to some extent described it already.

Bragg: Just looking at life as I saw it, I'm an adolescent child. I'm maybe not even that yet. But it was a neighborhood that was essentially blue collar. It was not an upscale neighborhood by any means. Our house was probably one of the biggest in the whole immediate area there. The world, you know, expands from a few blocks to a few miles, in terms of your awareness.

Not too far from where we lived, there was a kind of a bayou. I'm not sure that's right, but it's a little stream of water that comes through. It's gone now. I've been back. It's gone, paved over or something. But I learned to swim in this bayou. It was deep enough. Parts of it were deep enough to—. The other boys would go in there, so one day I just jumped in with my clothes on. It wasn't that deep. So anyway, I learned to swim.

Not too far from there was Carnes School, of course. I walked to the school. There was a vacant lot maybe two or three blocks away—I'm not sure why it was there—where there was a playing field, where we all went to play sports, baseball and a little football.

I remember one time we were playing, you choose up sides, you play. There was this one kid who was much bigger than the rest of us. I remember this particular play. He's running with the ball, and usually when Big George got the ball and started running, you didn't get in his way. He'd flatten you. And for some reason—this is probably what I got from my mother—I just didn't like the idea of being taken for granted, so I tackled him, and he flattened me, of course, but I did bring him down. The kids carried me home. [laughs] Took me home. Luckily—well, I had a hip injury that I never did lose, but I guess the point of it is that at some point, even if you're not particularly heroic, some things you just don't take. That day, I wasn't going to let Big George run over me. To my regret, I might say. It would have been much better to let it go. [laughs]

But you had neighborhood fights. Fellows would have turfs. One time, in a rock fight, a bunch of guys came through our neighborhood going away to Beale Street. You must have heard about Beale Street because that's where the blues--W.C. Handy and all that. And later, B.B. King and all those people, so, Beale Street was blues, jazz and blues.

And also that's where the theaters were. I think there was only one other place in town except on Beale Street where black people could go and see a movie, so most people went down to Beale Street to see movies and vaudeville.

And these guys came through, and I guess just for no good reason we challenged them and wound up in a big rock fight, and one hit me on the same hip. I'm not sure whether it was Big George or that rock, but the same hip got—. Again, they carried me home.

But basically it was the ordinary give and take of boyhood and being accepted. There was a rite of passage that you went through that consisted of crossing the street through a sewer. The street that we lived in had a rain sewer, for the water to run from here down to Spring Home Bottom, you had to go through this pipe. And the pipe wasn't all that big. You couldn't stand up. You had to crawl. And you had to be real small to get in there. But a test of your bravery was to go down on one side and come up the other side. It really wasn't that difficult, really, but if you've never done it, it tested your guts. And I remember doing that. Going back to the neighborhood years later, I don't see how I ever even got in that, the opening is so small. [chuckles] So you went through a number of tests like that that made you—you were accepted.

Living a little further, not too far from Carnes School, was my Uncle Charlie—Uncle Charlie was my father's mother's brother. He was on that side, and their last name was Waters. Charlie had this wife, Aunt Susie, who was very obese. Lived right near the railroad tracks, on Ayers Street. The thing I remember about that was across the street from them lived a family that I have seen some of them—I'm aware of some of them to this day. Their name was Winston. It was a fairly large family. Well, maybe five or six. Probably that large. The difference was that this Winston's father also ran on the railroad, that was still a good job, and so we thought of them as being rather well off, the Winstons.

Incidentally, they attended a Catholic school there as well. And I think Winston was a Catholic till he passed. By Winston, I mean this particular one, the one who was my age, whose name was Elijah, biblical name.

Going a little further was Beale Street. And that was where you went on Saturday if you were a kid, to the movies. It was maybe, oh, a few miles. It wasn't a great distance from where we lived. But you'd save up. You'd collect [knocks table three times, then drums table as he tries to remember] bottles, like Coca-Cola or whatever. And maybe it's a penny apiece or something like that. And save up enough money to be able to get into the movies.

Now, on Beale Street at that time, there were three movie houses. One of them had vaudeville. That was the Palace. And the other two just had movies. But right next to the one that had vaudeville was a place called the One Minute, and it's there to this day. Beale Street has been made into a big, schlocky tourist trap, torn down and essentially it's just like Pier 29. There was no pier. But there was a Beale Street. But it's been prettied up, pretty much, but then it was gamblers, prostitutes and hustlers and whatnot. Fast life.

But that was where you went to see the movies. For ten cents, I could buy my way into a movie and see a feature, a newsreel, a comedy, and a serial, and vaudeville. All of that for a nickel. Before I went in, of course, I would buy a hamburger at the One Minute, which was famous—they have a reconstructed version of that to this day, so many people remember that. Well, at the time, I thought it was great. Now I realize it was just meatloaf. They'd have this big steam table there. It's a Greek place. And lots of garlic and whatnot, sort of a bun, kind of like sourdough bread. But for a nickel you could get this, quote, hamburger.

Wilmot: It sounds delicious.

Bragg: It was! It was! [laughs] All that garlic and stuff.

The meatloaf we were used to, of course, had too much bread in it, but this was mostly meat. And so for a nickel you'd get this hamburger and you'd go in and see this movie and all that stuff, and for a dime, that was it. The first vaudeville I saw were acts that played there. If you were going to play anywhere in Memphis and you were black, you had to play the Palace. That was it. So everybody who was starring in those times would come through there.

So basically that was Memphis as I saw it. I didn't see a lot of it because by the time I got to where I would be moving around, I was going to school out in the rural area of Woodstock, Tennessee, which was north of Memphis, about, oh, nowadays maybe a thirty-minute drive, but then it seemed much further.

Wilmot: I have a question. Where your grandmother lived, what was the neighborhood called?

Bragg: My paternal grandmother lived in Collierville, which is due east of Memphis.

Wilmot: And that was right next to Spring Home?

Bragg: No, no, no, no. Back up. In Memphis, that was where the matriarchy lived.

Wilmot: The neighborhood in Memphis. What was that called? The neighborhood in Memphis.

Bragg: It was north Memphis.

Wilmot: They called it north Memphis. Okay.

Bragg: On Mosby Street. That was where we lived. My father's people lived in Collierville, which was about thirty miles or so east of Memphis, a little country town of maybe 2,000 people.

Woodstock was north of Memphis, about the same distance, in a rural area. In fact, nothing but farms around there. By now, of course, the suburbs have spread out there, so it's mostly just new suburbs, but then it was farming. It was a county school. It was called Woodstock Training School. It had dormitories, girls' and boys' dorms.

I guess what happened was my Uncle George was teaching school there, teaching mathematics. It was rare, too. K through 12. And probably he got a break on my room and board because he taught there. That's the only reason I can figure why I went out there, rather than back in Memphis.

So I went out to Woodstock. Lived in Bankrupt Hall. They called it that because the way the school was situated, there was a country road that was going like this [demonstrates]. Over here [demonstrates], there's this red schoolhouse and some other buildings there, maybe half a dozen or more buildings altogether, including the girls' dorm, which is modern and all the conveniences; the principal's house; the home ec building, and a few other buildings like that, and outdoor privies and whatnot.

But Bankrupt Hall. A guy had opened a business on the other side of the highway selling to students—like, a school bookstore. Except that he sold little stuff and whatnot. But apparently he didn't do too well, so he went bankrupt, and they bought it and made it into a boys' dormitory, so it was called Bankrupt Hall.

It was divided into basically two big rooms. One was a big bullpen where the boys—there was a big pot-bellied stove there. Stood about so high [demonstrates], I guess. Just a coal fire. Or wood. There must be, oh, seven or eight of us in that room. And then in the back, my uncle and his roommate, who was the science teacher, were the adults in this Bankrupt Hall.

But anyway, that was Bankrupt Hall. It was fun. I enjoyed it. I did well in math and stuff. In fact, I was either the valedictorian or the salutatorian, whichever one—something like that, probably second. Got to know people who—some people came from around the state and lived in the dorms, boys and girls, and some were just community people who lived on the farms nearby. We had an outdoor privy out in the back. There was no running water in it. I suppose we had electricity. I don't remember lamps, so I'll assume that we did have electricity. But hot water—put a pan on the stove and you heated it. So you can imagine, we didn't bathe that often. We must have all been pretty ripe. I've often thought, How come we don't remember them smelling? They must have smelled. Because nobody bathed that often. Maybe because nobody bathed, everybody smelled, so nobody could notice. [chuckles] But there was no such thing as taking a bath every day. That just wouldn't happen.

There were a lot of things that were interesting, but two I remember in particular. One had to do with the typical starting of the day's program. Every morning, the whole school met in the assembly hall. You started your day off there. Each day, a different teacher had the responsibility for putting on some kind of a little program. Typically this would involve somebody reciting some poetry or little skits or stuff like that.

I had a good memory, so I often would recite these little Paul Laurence Dunbar type poems. I don't know—your background is urban planning, right?

Wilmot: Yes.

Bragg: So you wouldn't be too familiar with a lot of black literature.

Wilmot: Actually, I'd be somewhat familiar, yes.

Bragg: So Paul Laurence Dunbar—you would know who he was.

Wilmot: Yes.

Bragg: "Little black baby with sparkling eyes, / Come to your pappy and set on his knee. / What you been doin' now, making mud pies?" I memorized stuff like that. I can remember that one! [laughs]

But the typical program to give students a chance, an opportunity to speak, you would have to say something. My recollection of the way it would come about would be to start with the principal's name, it was Roddy. "Mr. Roddy, members of the factory, and student body"—and then you'd go and launch into your speech. But the point was that "faculty" was not a word that came easily off the tongue, so often it would come out "factory." If we thought about it, well, we were kind of a factory. [laughs]

Wilmot: So you had to—it was, like, oratory. The students or the faculty?

Bragg: Well, the students. The teachers would grill you, would train you, and they would get graded on how well their students performed.

Wilmot: Whoa!

Bragg: So as I said, I liked acting and had a good memory, so I could memorize long poems. Those antebellum poems, I memorized a lot of them.

Wilmot: Are there any of your favorites?

Bragg: No. No, the only one I remember, and I don't remember it anymore—but some of them had a lot of wisdom in them. Things that had come from slaves, who were speaking about their condition. This one was called the "The Indignation Dinner." And it goes something like this—and I'm not sure I'll get the dialect right because it's been some time now, but essentially it said:

There were hard times in our neighborhood one year
So we held a secret meeting where the white folks couldn't hear
To discuss the situation and see what could be done
To get a merry Christmas and a little Christmas fun.

They would have said, to "scuss the situation." Something like that. The essence of the whole story is what they decide is there's no point in being despondent or depressed about Christmas coming up. There's some chickens over there and stuff over there. All you need is a committee to go collect this stuff.

And so:

They abused the white folks' scandalous
Till old Patrick Simmons riz, leaning on his cane to s'port him
On account of his rheumatiz.

And he goes on to say, "We don't need to be running these white folks down. All we have to do is elect a committee to go and bring the stuff in." And the poem ends by saying—let's see:

We had a great time, but not because we were dishonest,
Just indignant, that's all.

"The Indignation Dinner." So poems like that, I memorized—you know, we'd memorize. Most of them, I could do the dialect. In fact, much of the dialect I spoke, anyway. Can probably speak some of it to this day.

My Uncle George had had polio as a child, and one of his legs withered and never was fully extended, so he'd walk with a crutch. That could be the butt of jokes. I remember one that—I unwittingly made him the butt of a joke, and I didn't realize it. It had to do with a poem about lying in the church. It essentially said that, well, your infirmity comes from lying in the church. I didn't make the connection. In later years, when I realized that I'm essentially exposing my uncle to a certain amount of humiliation, I just never felt good about that. Didn't know it at the time. I would not have done that had I thought. It was just reciting some poetry.

But Woodstock was interesting. I became aware of girls there. After all, I'm now up to about fourteen. It was very pleasurable, a very pleasant experience, a very pleasant feeling, I might add. A little bit too young to really do too much about it. If not, not

realizing that we weren't too young. The one incident that I remember that speaks to that issue—not me, but one that occurred: This building, this red schoolhouse, was a rather long structure with classrooms on either side of the hall. Upstairs was where the caretaker and his family lived. And so we didn't go up there. That was off limits. But that's where they lived.

Well, apparently school was out, and most students had gone home, but this one girl who lived in the dormitory was still there. Her family hadn't come to collect her or something. She and a boyfriend from the neighborhood made an assignation up in this schoolhouse, and the caretaker, asshole that he was, catches them in the act and exposes them.

Naturally, it got all over the school, and it led to her dismissal. Which was wrong. That wouldn't happen today, of course. But for a while there, that was the gossip and the joke of the school, that Johnnie Mae and I forget what the guy's name was, Something Albright.

I picked a little cotton. By little, I mean maybe a pound or something like that. The guy who taught Greek rented a little land and grew some cotton. One day he hired some students to go out, gave them an opportunity to go and make some money. I remember that it was so hot out there that I didn't stay out very long. I don't think I even turned my crop in. I might have. I don't know. But my one foray into cotton picking was at Woodstock Training School.

Wilmot: It sounds like it was a classical education in many ways. There was Greek there and—

Bragg: Yes, Greek and Latin.

Wilmot: Yes.

Bragg: That came in the upper grades. I was still in elementary school, you see, but it's a K through 12. This guy taught Greek and Latin. I think his wife taught English. But I remember my sister could conjugate all the verbs and stuff like that. I left at the end of elementary school.

Wilmot: Eighth grade.

Bragg: She remained there and went on—she got a scholarship to Tennessee State when she graduated from there.

Wilmot: This is Althea?

Bragg: No, Alberta.

Wilmot: Alberta. I'm making up a name for her. Sorry. Was it primarily African American students?

Bragg: That's all it was. Let me make sure you understand. The era that we're talking about, the only time—we had white nuns teaching in St. Anthony's, but in Carnes Elementary School, Woodstock, the teachers were all black. In all cases, the students were all black.

I don't think I was in an integrated classroom situation—I know I wasn't!—until I moved to Chicago. In fact, I didn't have many white teachers, except the white nuns, until I moved to Chicago.

Wilmot: And playmates?

Bragg: In fact, I didn't know any white boys. The only time I ever came into contact with any was one time, I was going to this neighborhood and a guy—I don't know how we started up fighting, but we were fighting. "Here comes a black guy, so we'll fight him." I was with my brother then, as I recall. I don't recall, but I'm pretty sure that was it.

But in the classroom, there was no white person next to—we weren't in that kind of situation. There were situations like that, but I was never in one. My contacts with white people really began when we moved to Chicago, when I moved to Chicago.

Wilmot: What does this say? [shows outline Bragg has created for her]

Bragg: Ayers and Lane Street. I mentioned Uncle Charlie and Aunt Susie. I mentioned that's where they lived. The Winstons lived across the street.

Wilmot: Okay.

Bragg: The only thing about that was Aunt Susie was so gross. She was so big that Winston, who was a good cartoonist, used to draw pictures of my aunt in the back of a car, and the front of the car—the wheels would be off the ground. I couldn't very well object. It was funny. [laughs]

And Aunt Susie was one of these ladies that constantly—she was a huge woman, but babied. Treated like a little flower. Dainty.

Wilmot: That's nice.

Bragg: And Uncle Charlie drank. I remember—as a boy, you're around the house more often. You don't see the men that much, so you don't get their take on things until you get older. At that age, you're still seeing more women than men, and so you hear what the women are saying and all that. "Oh, Uncle Charlie. He drinks too much," and all that. There was a bootlegger in the neighborhood, down the corner there. Everybody knew where he was, where he hid his liquor and all that. The police knew. Everybody knew.

But it wasn't until many, many years later, when I was fully grown. I went back to Memphis and looked up my Uncle Charlie. By that time, Aunt Susie's dead. He's not drinking anymore. I finally realized Uncle Charlie's problem was Aunt Susie. That's what made him drink.

But that was Ayers Street, the main avenue. Nothing exceptional about it otherwise.

Wilmot: What was your mom doing while you were in boarding school?

Bragg: Mama went to work as a seamstress. She was more of a designer than a seamstress, but she worked mainly as a seamstress. She bought a portable sewing machine, and she

would go around and work for well-to-do white people, and she would take fashion magazines like *Vogue* and copy the designs. These women, who were well-to-do, got essentially Paris originals for nothing. She was just that good. But very independent. Would never leave her sewing machine. If she knew she was going to be there for the next two weeks, she would still take her sewing machine home.

Wilmot: Every night?

Bragg: And the reason was that if she didn't feel like she wanted to go the next day, she wouldn't go. She just felt like there was a certain amount of independence that she was entitled to, that she wanted, and so she had a portable sewing machine. Never left it on the job, so to speak.

In Memphis there's a thing called the Cotton Carnival. It's like one big social bash. The well-to-do white people vie for the role of the Cotton Carnival Queen. It may not be true anymore because cotton is not that big anymore, but in those days, this is still coming off of the Civil War; we were not that far behind it. The point is that the whole trousseau, the whole outfit for the queen of the Cotton Carnival, my mother sewed it for her. I mean, from scratch. Didn't go to Paris for a thing.

Wilmot: Did your mother dress very beautifully?

Bragg: Not particularly. I think she would make us costumes if we had to be in a play or something like that. She wasn't dowdy, but she never went out of her way to be fashionable herself. But she could do it.

Interview 2: June 25, 2002

Wilmot: Today is June 25th. It's Tuesday, and I'm here with Robert Henry Bragg.

Bragg: And you want me to say something.

Wilmot: I want you to say something.

Bragg: Okay. Something.

Wilmot: That's good. Okay, so good morning.

Bragg: Good morning.

Wilmot: Thursday when we closed, we were talking about your time at Woodstock Training School, where you spent seventh and eighth grade. It was a boarding school. I had asked you about your mother and what she was doing while you were away in boarding school, where your uncle was also a teacher. That's kind of where we closed. We can actually talk a little bit more about your mother, or we can go on. Pretty soon, I guess, your family moved to Chicago. But I would like to just ask you again about your mother.

Bragg: My situation was that my mother was still living in the house on Mosby Street, where we had all ganged up years earlier. My younger sister was living with one aunt in another part of Memphis, my brother was living with another aunt, and I guess my mother was in the house with Great-grandmother—I'm not sure now, come to think of it.

Because we (my sister Alberta and I) did go to Woodstock, the boarding school, about half an hour's drive or so north of Memphis. In those days, of course, the automobile tires weren't nearly as good as they are today, so unless you were careful, you might have a flat tire just going thirty or forty miles. No comparison between the time it takes to go any—.

But at any rate, I guess Uncle George must have come up with some money or had privileges of lower tuition for relatives because that's how we wound up in Woodstock. Mama worked, as far as I can recall. She always worked as a seamstress. As I mentioned, she did have her portable sewing machine that she carried wherever she worked, and mainly she worked—not mainly, exclusively she worked for people who could afford to pay her a decent wage.

I say that because a lot of people do sewing. People bring used clothing and want you to make new clothes out of it and stuff like that. Whereas she could do that, it was hardly what she wanted to do. Didn't pay very well. People are always critical, and they were never satisfied.

The kind of work she did, she would go to work for very wealthy people, white people, typically a young woman who has aspirations for being fashionable and so on. My

mother would take fashion magazines like *Vogue* or whatever, copy designs, cut patterns for them, and make Paris fashions for what for them was no money because she was paid black wages, of course.

So that's the way—that was what she did.

Wilmot: When you say black wages, can you talk a little bit more about that?

Bragg: Well, in the South, circa 1930 or thereabouts, there was an inequity in wage for whatever you did, if you were black. In some cases, there was inequity even in the title that you got for what you were doing. For example, you might be working as a carpenter and classified as a laborer. That was just that way that they—the presumption on the one hand that there was no equality of performance between black people and white people, and therefore one downgraded the black person's title and his wage and everything else. That's what I meant.

She certainly earned more money than she would have had she been a cook or worked as a domestic, but she was not being paid as a professional tailor. So that's what I meant.

Wilmot: I understand.

Bragg: Anyway, that's what Mama was doing. I don't remember her making ever garments for me, believe it or not. She must have, of course. But one time, when I was still back at Carnes Elementary School, I had a role as Pierrot in a school play, and required that it have a costume that was like a clown, with a stovepipe hat, rather, a cone hat and turned up shoes. The shoes she made—maybe I said this before.

Wilmot: No.

Bragg: No? Well, it was a great costume. She did it from scratch with material that she saved from jobs. Colorful. It was all right except when it came to making the shoes, she didn't have any leather, and she just made them out of pasteboard. Sewed cloth on pasteboard. Of course, in the middle of the play, the shoes came apart. But I was a trooper, and carried on and realized that, well, if you just hang in there, don't give up, why, you can usually make it through.

But anyway, that's the only time I ever remember my mother sewing anything for me, despite the fact that she was a seamstress. She might have altered things. I had hand-me-downs, from two sources. One, my mother's half sister, that was Aunt Aline, by this time has retired from show business and is living in Long Island [New York] with her husband, who was a small-sized man, obviously. So I got hand-me-down clothes sent from Long Island to Memphis that her husband, for one reason or another, had discarded. So I got some of those, modified, re-sewn.

And I think I got some hand-me-downs from one of the white children at a place where my grandmother had been a companion for a rich old white woman. I remember even getting an aviator's cap from World War I. [chuckles] A guy finally—he probably died or something, and they decided to get rid of all those memorabilia, and I wound up with a funny looking cap that was leather.

So anyway, a long answer to your question was that my mother sewed. She sewed exclusively for white people because she couldn't make any money and didn't like to argue with black people. Not a question of disliking them, but she was rather—I wouldn't say haughty but—no, that word shouldn't even come up. She's not a person who likes to argue. She was very firm in her own—once she made her stand, she wouldn't give up. But she just didn't like any strife, and was very easily annoyed with any contentious stuff.

That's over-long answer to your question.

Wilmot: That's okay. I have a question for you. You mentioned the cotton festival and the cotton princess?

Bragg: The Cotton Carnival.

Wilmot: Cotton Carnival, and there was a cotton princess or queen?

Bragg: The queen.

Wilmot: Yes. And I was wondering was that primarily white people?

Bragg: Absolutely! [laughs.]

Wilmot: Okay.

Bragg: No, these are the movers and shakers of Memphis society at that time. Memphis was a big—we're talking about a long time ago. It may be to some extent to this day—but a major port through which cotton was brought and exported and whatnot. Cotton brokers. We think of brokers as selling whatever, stocks. But the big deal there, brokerage was in cotton, because that was a crop that—well, you have to understand that basically the Civil War was fought over cotton.

And as you come west from the East Coast, from South Carolina, Georgia, Alabama, and Mississippi, it got more and more heavily defined by cotton. Cotton. And large cotton plantations where cotton was grown, and then it was brought to markets, and it's moved all over the world from places like Memphis. This was a big, conveniently situated—used it as rivers converge at places like that. That's why towns form there. Anyway, Memphis was the kind of center of cotton, the cotton industry, and so people who were the movers and shakers were mostly people who dealt with cotton in one aspect or another: the warehouses or the brokers, who—incidentally, Rhett Butler—I guess he maybe ran guns but anyway, he probably was involved with cotton.

Wilmot: From *Gone with the Wind*.

Bragg: Yes, right.

Wilmot: Okay.

Bragg: So since that was where the biggest money was, it's just like a captain of industry, or a family that's high in society wants their daughter to be the queen of whatever it is that

they're pushing. And there it was the Cotton Carnival. In Louisiana it would be Mardi Gras, you see. In New Orleans, it's Mardi Gras. But in Memphis it was the Cotton Carnival, and that could be a whole week of festivities, parties and everything, that the white folks did.

The black people, that was not part of their thing. So big parades, like—I don't remember what day it would be, but the whole shmeer. So it meant that (white) people spent a good part of the year getting ready for this glorious carnival period. So sewing for the queen of the Cotton Carnival was like she's going to be the sharpest thing out there, hopefully.

And I'm saying that it was that quality of clientele that she worked for.

Wilmot: I have a question also. This is a kind of follow-up question about your time when you were at Woodstock. I'm thinking about your uncle and the other teachers there and their education, how they came to be in the position of being—

Bragg: Teaching in a county school?

Wilmot: At a county school, teachers at a county school, but not only teaching at a county school; it seems to me like it was a very superior education—

Bragg: Well, I'm not sure about that.

Wilmot: —so I wanted to ask you a little bit about that.

Bragg: I'm not sure about that. I really don't know whether it was good or bad. Let me say that it was probably— how to put this—it was probably better than average because the guy who was principal—maybe I mentioned this last time. I went there recently and found that they had named the campus for him, which either meant that he was there a long time and people never got mad at him or whatever, or maybe he ran a good shop.

My sister won a scholarship to the Tennessee State College, academic scholarship, at the end of her four years there. I didn't stay there that long, of course. So I would assume it meant that you had to have at least a moderately good education. But I don't recall there being any law that said, if you want to go to a first-class school, you go to Woodstock. The boarding aspect—people for one reason or another would farm their children out there, from the city, and get them away from the bad influences, I guess.

How their money worked, I don't know, but it was a county school. It was a public school. We had both city students from other places and the local people. Beyond that, all I could say is that I managed to do well in mathematics and the crude science stuff that you had at that level, so I was never at any disadvantage.

Wilmot: Did you have any sense of where your teachers were educated?

Bragg: Yes. Typically not from great distances, usually. My Uncle George I think had gone to Tennessee State. At that time, it was one of the “normal” schools. The “normal” schools were established after the end of the Civil War. Up to that point, America was basically just a big farming country. [phone rings] But I forget what the law was that was passed,

but what it did was to establish money for land. They would call it the Land Grant Act or something like that.

Every state would have money to set up a school for the education of citizens, men and women, boys and girls, in the “agricultural and mechanic arts.” That's the way the language of the law read. So you would see, like, Texas A&M or Alabama A&M, agricultural and mechanical. That's what the schools were for.

Wilmot: I believe Berkeley started that way.

Bragg: Exactly. It did. Berkeley used to be an A&M.

Wilmot: Yes.

Bragg: People don't realize that, but it was just like all the other—except that they went beyond that.

Wilmot: Yes.

Bragg: So its purpose was to educate people at another level for the benefit of the state, not to go out and do exotic art but meat and potatoes and practice and stuff like that. That's what they were for. And that's where the people who became schoolteachers went, a cut above high school. Now high school at that time was only about eleven grades. But you went to the normal school, A&I Normal it was called, something like that.

Typically they would go two years, at which point they would come out and become elementary school teachers. To do high school, you probably have to do four years. A typical elementary schoolteacher went two years, got a job, and then from there on, to get advances in terms of salary, would have to take additional course work. So it was quite common for them to spend a good part of their summers going back to summer school.

So that was the system. My Uncle George went to one of those schools, A&I. It was in Nashville. His roommate might have, for all I know, but my impression is that they came from the schools right around that immediate area.

Wilmot: I have another question.

Bragg: Good.

Wilmot: My understanding is that there was, during this time, maybe in more urban areas, was there more nationalism? Among your family and in your social arena, particularly African Americans and the African American community were people starting to think about—let's see, there was a Niagara Movement, and then there was Marcus Garvey. He came a little later.

Bragg: You didn't see that particularly. I know what you're getting at. I saw that when I came to Chicago. You didn't see that, for somewhat obvious reasons. Such protest movements were not as prominent in the rural—in the South. For example, Ida B. Wells. I notice the

request for archival material, access to my files [referring to bio bib], had two names on it: mine was one, and Troy Duster was another.

Troy Duster at one time was chair of the sociology department at Berkeley. Black. An outstanding sociologist. Well, he had an aunt, a grand-aunt, I think, named Ida B. Wells. [Ida B. Wells was the grandmother of Troy Duster]

Wilmot: Right.

Bragg: Who was run out of Memphis, Tennessee, because she wrote the kind of stuff in the black newspaper that essentially said, "We don't enjoy being treated like black folks." In other words, it was so dangerous that she left town, moved to Chicago. So the point was that there were those feelings, but that the freedom to express those—you run the risk of rope and the faggot.

Wilmot: Yes.

Bragg: I don't mean gay, I mean burning.

Wilmot: You mean fire.

Bragg: Right.

Wilmot: I understand.

Bragg: Now, when I got to Chicago—and I jump ahead; we can get back to that—by now, in Chicago, for me was 1933 on. The remnants of the Garvey movement, the UNIA [United Negro Improvement Association], were still there. You could see parades on Sunday. The Garveyites, as people called them, would be out parading in their red-and-black uniforms.

But the protests coming up to the thirties had to be pretty doggone measured. Otherwise, lynchings, stuff like that—I don't remember seeing any in Memphis. I never did. But that was common during that era.

What you got in terms of race consciousness was a certain amount—because of—your black teachers, to some extent, had gone to black schools, where—those were the only places where blacks, notable blacks would have any chance of getting a job, for example.

Wilmot: As professors?

Bragg: Well, I'm talking about, yes, the black colleges. Very few black academics ever had a job north of the Mason-Dixon Line, or in an integrated college for that matter. That was very rare. So they went to places like—well, Tuskegee [Institute]—well, you know, that was probably one of the most prominent ones that everybody would know about. But other places, Atlanta U. [University], Morehouse [College], Spelman [College]. Probably you could name fifteen or twenty that had fairly good academic standards, but their faculties were either white or blacks who had gotten degrees and had to teach in those schools or they wouldn't have a job.

I hope I answered your question.

Wilmot: You did, and I think what's really good is you answered my question before I asked it.

Bragg: [Chuckles]

Wilmot: It was exactly that, about race consciousness and what race consciousness was like, for you, growing up in your family, whether it—

Bragg: I didn't quite finish that point, because I was going to mention that my recollection of what I learned in the South was that Roscoe [Conklin] was a great orator, and I can't remember any more than that about him. And that Roland Hayes was a great tenor. Years later, I actually managed to hear him sing here in San Francisco. By that time, he was a very old man. There was another singer who won some fame. I don't recall whether I heard anything about W.[E.]B. Du Bois or not.

The Niagara Movement—it began around 1910, I guess. I don't think the NAACP [National Association for the Advancement of Colored People] was that prominent. I don't recall it being something I knew about then.

So there were things we were told we should be proud about. I heard about George Washington Carver, I think. And, of course, Booker T. Washington, because Booker T. was the antihero. In the South, Booker T.—well, you perhaps know this story—but Booker T. Washington made, you might say, a bargain with the devil. He went to Tuskegee to found a school, which was fine. In the worst place in the world, at Tuskegee, Alabama, which was essentially nowhere. He had been trained at Hampton [Institute] in Virginia, I think.

He managed, by virtue of cajoling the white people to support this school and getting students to come and more or less learn by doing. The original buildings were all built by students who came there and built their own classrooms and so on. So it was a tremendous effort.

But he argued always that—this is turn of the [twentieth] century—that black people had to sort of earn the respect and approval of white people by not aspiring to equality. And I'm not phrasing this exactly, but basically it came down to saying: "Learn how to work for the white people and be reliable and all that and have skills, and don't worry too much about being the mayor or the president or whatever." That's what it all eventually came down to.

In that way, he became—. And he made a powerful speech at the Atlanta Exposition of 1890-something that said: In all things that are social, we can be as apart as the fingers. But in economic progress or something like that, we could be like this [with his fingers, demonstrates closeness]. In other words, we're not going to push for social equality, but we're going to work together.

Well, that in a sense practically accentuated the Jim Crow aspect. It said you're not going to worry about getting the right to vote. So over time he's been pilloried for being the guy that essentially wrote—. For this, he became the spokesman for black people. In that era, that meant a lot of power, and so virtually anything that you wanted to do that

Booker T. Washington disagreed with, you were just not going to get it. In the places of power, he was the spokesman.

And so naturally—my brother went to Booker T. Washington High School in Memphis. There would either be a George Washington Carver school, somewhat later. But Booker T. Washington schools—you probably wouldn't find a big town in the South that didn't have one, have a Booker T. Washington high school or elementary school in it, so pervasive was this attitude at that time.

Du Bois, of course, was opposed to that. We'll get back to that at some other time, if you'd like. But that was the—it was the Booker T. Washington mentality that pervaded the—that was the way the white society, the white power structure dealt with black people. Stay in your place. Be a good bricklayer or carpenter or whatnot, but we don't need you to be an engineer or a scientist, and you're certainly not going to be the mayor or the governor or what have you. So that was the way things were.

Wilmot: In Memphis, Tennessee.

Bragg: Yes. And you could go right through the South; it would be the same.

So that was the Tennessee that I left. Uncle George was a great role model for me. He was a man who was honest. He was a good math teacher. We were the children of his brother and so that was his bit to help the family, so I've always respected him for that. He had a nice personality, too.

Wilmot: Do you remember, either explicitly or implicitly, ways that your mother or grandmother brought you up and tried to help you survive in that kind of environment as a young African American man?

Bragg: Well, at that time, I'm still a boy.

Wilmot: Yes, as a young boy, then.

Bragg: The contacts between—I lived in essentially a black world. It would only be if you went to quote, downtown or something like that that you ran into any white people, except where there were, quote, white-only jobs and so on. Certainly in Woodstock that was true, for example. I can't imagine what a white person would be doing coming through there. Maybe a county road or something. But basically the world I lived in was a black world.

Now, it's not true of when I was at St. Anthony's church, because, as I said, that was a segregated church: white, black [hits table to demonstrate separation]. The priest was always white; the nuns were always white. And on occasion they might take several of us to one of the Catholic boys' schools, white Catholic boys' schools, and we would sort of—I remember going to see a couple of plays or something like that, probably. They were just trying to enrich our curriculum. The neighborhood stores typically were black owned or black operated, so even there, unless I went downtown, which would be, like Main Street, where there would be a five-and-ten or Kresge's or something like that, I wouldn't see any white people.

But other than that, it just wouldn't happen. The pattern of residential segregation was such that for me—after all, I'm less than fourteen years old; I'm not going all over town. So it's not that “You didn't know your place.” I don't recall anybody going out of their way to push this notion.

But—well, for example, I remember at Woodstock they had a choir. The school had a choir, and they would compete with other rural schools for whatever the competition was. The understanding was that whatever you did, you better sing some spirituals, because they don't want to hear something that doesn't sound like you were practically back on the plantation.

I think I made the point that the image that the power structure had of what you were supposed to be doing was that at a certain level, you ought to be thinking about ol' massa or whatever, satisfying ol' massa, and wait until hereafter for your reward, and all that. So that, you learned from the older people, and that attitude got handed down.

And wherever you had to confront white people—a simple thing like walking down the street. If you're downtown and you're walking down the street, a white person coming along has the right of way. You don't. You have to step aside for him or the consequences may be very grave. You're an uppity Negro or a nigger, as they would call it.

But you don't have to write a book on this and take a course on this to learn this. It just comes from just about everything you do.

Wilmot: Sort of pervasive.

Bragg: So you—well, the notion of second-class citizenship was just part of the whole culture, and so it was kind of hard to deal with that. Not to internalize it. That's what I'm saying.

So the answer to your question is no, I didn't see much in the way of a protest. At the elementary school, I wouldn't have seen it, unless there had been a lot of activism in my immediate family, and there wasn't.

Wilmot: Right. Yes. I want to switch gears just for a minute, before we go to Chicago?

Bragg: Sure.

Wilmot: And I wanted to ask you this question, which is what were you like as a child?

Bragg: Um, okay. Well, first of all, I was puny. Probably the word "sickly" would accurate, asthmatic. I mentioned that I peed the bed.

Wilmot: You did.

Bragg: But people remembered me as being bright, a bright, smart kid. And friendly. I wouldn't say that I was cowardly, but I would go out of my way to avoid something that's likely to result in a fight. I only had two or three fights in my whole life, fistfights. It's not that I'm—as I say, I wouldn't run, but I would try to turn it away. People generally liked me, I thought.

I was rather articulate, and not above spouting off, too, so that generally I managed to kind of get along very well. I think I enjoyed, pretty much, life. I never felt we were—poverty never really hit heavily on me. I don't remember ever missing any meals or even being hungry. I remember there not being a lot of money, but I don't remember suffering, particularly. Most of the people around us also didn't have any money, so that something I might have seen more clearly a little bit later in age, I didn't see then, while I was there in the South.

I'm sure later on the differentiation would have come. But even then, I was sensitive to the fact that some people had a lot more money than others, because even at St. Anthony's, I remember mentioning that the black bourgeoisie would send their kids there. Some of them were pretty well off, with the big Cadillac and all that, so—

Wilmot: It's hard not to be sensitive to issues of money difference when you're surrounded by people who are wealthy.

Bragg: Yes, you kind of know that you're not rich. [laughs]

Wilmot: Are there things you particularly remember enjoying? Are there activities and things that you remember being very fun and wonderful?

Bragg: Just the usual things. Well, before going to Woodstock, the fifth and sixth grades I spent at the Catholic school, and I guess about all that I did was what the rest of the kids did, like you played sports. Not in the Little League sense that we have today. We didn't have that kind of organization. It was the kids pick up games in the park, you know, in an open playing field, a field that somehow was used for playing because there's nothing out there.

Like, learning to play baseball or softball. I remember that I never was very good as a softball player, as a ballplayer. I didn't learn [until] later that it was because I couldn't see too well.

But I did the things that other boys did. I mentioned going through the rites of passage, going through the sewer and stuff like that. Going down to Beale Street. We just did what everybody else did.

Wilmot: Did you remember reading? Were you a very avid reader?

Bragg: Yes, I was. Read everything. One of my aunts, the aunt my brother lived with, read a lot, too, and she would read these pulp magazines. I read a lot of that. That was mostly what was available to me. And I can remember I would read these "Shadow" magazines. Way back then, even, there was the Shadow. But *Wild West Weekly* and stuff like that. I read all that stuff.

I didn't read particularly with purpose. I just read. In fact, I seem to remember that I read just about all the books they would lend me in the school library when I was at Woodstock, which meant it wasn't much of a library. Obviously. But, yes, I read a lot. And as a consequence, I developed a rather big vocabulary. It wasn't too small to begin with.

Speaking about reading and vocabulary, I guess I didn't mention this, but if I did, stop me. When we left Florida to go to Memphis—I've jumped back—we went in a truck. My father and my mother and my brother were in the cabin of the truck, and the rest of us were in the bed of the truck, along with the owner of the truck and another man.

I never forgot this. In talking to this other man, the owner said, "I let him *driv* [sic] because he had his wife with him." Now, that mistake in grammar, at that early age, just stuck with me. I knew he meant "*drive*," and he had mispronounced it "*driv*." And so even at that age, as I said, I had quite a thing with language. I could always write well, write good compositions. I won short-story prizes later on. We'll get to that. So I was always good at language. And that came from reading a lot and, of course, talking a lot. [chuckles]

Wilmot: You mentioned to me last time we spoke that when you left Florida that was the last time you saw your father?

Bragg: Until I saw him in his casket.

Wilmot: And how old were you then?

Bragg: When I left Florida?

Wilmot: When he passed.

Bragg: Oh. It was '38. Wait a minute. Yes. Is that right? I was one year [phone rings] into community college, so that must have been it, yes.

No, that was it, from the time that we left in '23, I guess, or '24, until I saw him in his casket in '38. That's the next time I saw him. I'd heard from him, initially, by mail. But after a while, that stopped. Well, that's it.

Wilmot: Was it just you who moved to Chicago? Was it your family?

Bragg: Just me. The situation was that we're still in the Depression. The Depression really began to get serious in the early thirties. The crash occurred in '29. But it didn't really begin to get serious until two or three years later. It really was very pervasive. At first it just hit people who had stock. But after a while, the whole economy just sort of ground to a halt. As late as the election of President [Franklin D.] Roosevelt in 1932, we were still in the depths of Depression. Which we never really got out of until World War II bailed us out of the Depression! We never had fully come out of it. Never did.

But the point is that my Uncle Teddy, whose name was William Peter MacFarland, nicknamed Teddy, had moved to Chicago a few years earlier. Remember, when we arrived from Florida to Memphis, he was still there, working as a plumber. That was '24, '25. Well, he had moved to Chicago and managed to be doing very well. He had come back to Memphis, and married his wife, my Aunt Edna Mae Clarke MacFarland. Her father had been a dentist, and she was a schoolteacher.

And then, for several years, they tried, I guess, but never had any children. So now we have Camille with this brood back in Memphis. Here (in Chicago) we have Teddy and

his wife, and he's doing very well. But they didn't have any children. Well, "We will raise one of your children for you. We don't care which one."

The joke I like is that sent they the runt off to die! [laughs] Me! But I fooled 'em. No, I don't know how the decision was reached because the Chicago climate was considered to be a lot worse than the climate in Memphis, so why would you send this puny guy, who is asthmatic and all that, to go up to Chicago and freeze to death? So that was why the joke said, well, he's the runt, and his prospects aren't too good anyway, so just send him up there.

I'm sure that's not true.

At any rate, a convenient breaking point was going from elementary school to high school, for a number of reasons. One is the quality of education in Chicago available to black people very likely was superior to that available to black people in Memphis. I was considered to be very smart. My sister was considered to be smart, too.

Wilmot: Alberta?

Bragg: Alberta. She was still at Woodstock, though, and I guess to make the transition at that time—she was probably a junior. She was two years ahead of me. That probably didn't make too much sense right then. So I was the logical one to go. My other sister and brother were with aunts who were doing all right to start with. So I'm the most expendable in a way, and it makes the most sense, it seems to me in hindsight, that I should be the one to go.

So I was the one that went. It was quite an event. I remember we got together, took a picture, which I have a copy of, of the four of us. The neighborhood responded with a lot of help. I remember going by Greyhound bus to Chicago. I must have had five or six lunches and a money belt. Maybe I had five dollars, too. But somebody gave me a money belt to put the money in!

And so I arrived at Chicago. I was told what station to get off at to be convenient for my uncle and aunt to pick me up. Of course, I made a mistake, and the bus went on down to the bus terminal, which was then at 12th Street, I think. I get off, and there's nobody there to greet me, and so after a while, I go to the telephone—I've got their phone number—to ring them up.

Well, it turned out that the exchange in Chicago had so many more numbers, so many more people, that there was one extra digit on the telephone number. I didn't quite know what to do with that, so. In the act of trying to phone them, my uncle and aunt actually walked into the terminal and found me there.

And so took me out to my new home. Now I'm in Chicago with all these lunches. We ate off of these lunches for several days!

Wilmot: It sounds like you were anointed and sent off like the Prodigal Son.

Bragg: Yes, with lots of good wishes, of course. So there I was. I don't know what I expected to see, but what I found was that yeah, Uncle Teddy was doing pretty good, but we were

living in the back of a store. It was on State Street, not too far from 47th Street, 4641 S. State Street, which was a major thoroughfare. What they had done was just build an apartment in the back of the store.

The front of the store was a flower shop, flower and pet shop that my aunt ran. She had a designer who made designs, at first. They had some pets: birds and little goldfish and stuff like that.

Wilmot: Flowers and pets.

Bragg: Yes, flower and pet shop. And that's where I landed. There was one other guy who lived there, and I'm not sure he was there at the beginning but somewhere along the line he showed up. His name was Robert, and I don't remember his last name, and I'm not sure exactly what he did, but he must have been taken in by my uncle and aunt. Because I remember initially I peed on him, too.

Wilmot: What do you mean, you peed on him, too?

Bragg: Well, I was still peeing. But that very soon was solved, when it was discovered that I had this condition. My aunt took me to a doctor. Now, I don't know what they gave me. It could have been a placebo or whatever, but it practically overnight stopped. That, of course, was welcome to all parties, including me.

So there we are, flower and pet shop. Next door, my uncle had a plumbing shop, but mostly it just kept plumbing supplies, and very little was sold out of it. I discovered that Uncle Teddy handled all of the plumbing and heating problems of the real estate empire of Oscar de Priest.

Oscar de Priest—small d-e capital P-r-i-e-s-t—was the first black congressman to be elected to the Congress after the Reconstruction. That occurred in 1932, I think. So from about 1900 roughly, for a good thirty years, there wasn't a black in Congress. He was a Republican, from a family that had come to Chicago from Louisiana. They were all artisans. They were plasterers and bricklayers and in the building trades, and had managed to acquire a lot of property, so he became rather well-to-do. Got involved in local politics in Chicago and eventually ran for Congress and won a seat in Congress.

So the de Priest family was well off. Having all of this property, they needed to keep it going, maintain it. Uncle Teddy had at one time worked in the stockyards and learned the city and all that and gotten his license, but somehow he wound up—I don't know how he did it—wound up with this job, having all of de Priest's property.

And that was fine because it was more or less freelance. He didn't go punch a clock. He wasn't a lazy man, and he doesn't goof off, but he was his own entrepreneur, you might say. He had an airplane, which we'd go out to the airport on Sundays and fool around with. Sometimes he would fly. Not too often. But just get around. He loved that flying.

That was the situation that I found when I arrived there. It was actually the end of 1933. I had one semester over, one high school semester, at Woodstock, so I entered high school in Chicago in the second semester. But for all practical purposes—

Anyway, that was the situation. Here's Uncle Teddy. He's doing well. He's got an airplane, even. We have this flower shop. They are young still, and they're going to parties and whatnot, wears a tuxedo. Looking pretty good.

And I have to go to school. So now I have to pick a school. At that time, where we were living, there were three possibilities that made any kind of sense. One was Wendell Phillips High School, which was all black, in sort of a ghetto. If not exactly a ghetto, heavily blue collar. Wendell Phillips was a very famous liberal—in an era not too further back from that. Exactly what he did, I don't know, but it was natural to name a school after him.

Then there was Du Sable [pronounced dew SAH-bull] High School, which was very close by. That was quite new, right on State Street, not much more than two or three blocks from where we lived.

Then there was Tilden Technical High School, which was about a half a mile or so away. I had a choice of taking the one I liked, even though I didn't have any basis for comparison. Except that my Uncle Teddy, who was a plumber and who worked in the building trades, knew enough to know that engineers were technical people; if you had a technical bent, then do engineering. He had no idea about science, of course, but he knew that engineers were the next step intellectually from carpenters or bricklayers or electricians or machinists or whatever. So it meant you should be an engineer if you like technical things, then that's what you ought to do.

It turns out that for plumbing one has to do with the transmission of heat from one place to another, and plumbing has to do with usually moving of fluids or water from one place—one has to do with civil engineering; the other has to do with mechanical engineering. But the technical basis is closer to mechanical engineering. Civil engineering is concerned with big pipes, like big sewers and stuff, but water supply, that would be closer to mechanical engineering.

At any rate, so I went to Tilden. I chose to go to Tilden. Oh, another reason. Du Sable, which was named after the first resident, the first person to live in Chicago—Du Sable was a black man who I guess had a French father, or he was Haitian, probably. Had set up a trading post there. Where the Chicago River comes out at Lake Michigan I think is where the original trading post was. And he traded with the Indians and the city grew from there. Although the city is named Chicago, the original settler was a guy named Du Sable. And they named this high school after him.

I guess I didn't choose Du Sable because first of all, it wasn't a technical school, and it had gotten the reputation for being already not terribly heavy in terms of academics. So I went to Tilden, and that was quite an experience, because Tilden was all boys. It didn't have any female students. I arrived mid-year. It was the beginning of the second semester. But wasn't asked to step back or anything, just moved right in.

At first, of course, it's a little bit—I don't think it made much of an impression on me, the fact that now I'm suddenly in an integrated school environment. I don't recall being impressed by that. For one thing, I'd been used to always being just about the smartest thing in my class. And there was nothing in these classes that changed that. So I don't

recall being at all intimidated by that environment, maybe because I had always been used to being just about the smartest thing in any classroom situation that I went into.

Wilmot: Are you saying you continued to be the smartest thing in that class?

Bragg: Usually, yeah. Yeah. Especially if I liked it. Now, I didn't have the best record. Some of that had to do with just initial adjustments. Some of it had to do with just not doing the work. But—well, to give you an idea, out of a graduating class of about 400, I was about 60 down.

Wilmot: Got you.

Bragg: But initially my impression was that—I don't think I was—well, let's put it this way: As far as I was concerned, I was just like any other student in the class. But the general attitude toward black students in white classes was that they are not expected to do very well. And in some cases, I got very poor grades that I could only say—one or two—came from, not my performance, but the teachers' feeling about where I stood.

On the other hand, I'd have to say that the math teachers, especially the toughest ones, gave me the highest grades. There's a message in there somewhere. The science: so-so. But on the whole, I'd say that my career at Tilden took a different path because at the end of my first year, I guess it was, I got a job after school. I worked right after the last class and did that the whole time I was there, from then on. I worked about five hours a day, from the sophomore [year] on.

Wilmot: What kind of job did you get?

Bragg: Well, I worked in a tea room. My uncle Teddy had the practice of—it was the way you did things. On Sunday, my aunt, who normally cooked dinner every day, didn't cook on Sunday. Wouldn't cook dinner, rather. He would take us out to dinner. The place where we went was a tea room operated by a woman who had once had a much bigger restaurant on State Street, where he would go during his working day.

But things got so bad that a lot of people couldn't afford to eat out even there. And she had this huge apartment on Michigan Avenue at 48th Street—yes, the 48 block on Michigan—that she converted part of the front, big living room, and put a number of small tables in there. That was one dining room. And all these six-flat buildings in Chicago would be flats on either side—two to a floor. And they're long, deep things, seven or eight rooms deep. So there's a bedroom, there's a bathroom off the hall, then there's a back, actual dining room, which was what that was for; and then another little bedroom and kitchen, and another little room behind that. So there were a lot of rooms there.

I don't know how the job came about, but from my sophomore year on, I went to school, and I left Tilden at two-forty-five or whatever it was, took the 47th streetcar over to Michigan Avenue. She would feed me a light snack, and then I'd start to work and work the dinner meal. And I'd work on Saturday. I don't know if I worked Sunday or not, but probably not. One of them she used as a pantry, one of them she used as a kitchen, of course. And there were two dining rooms. What she had done—the place where she had had her restaurant before, quote, "the hard times" was not too far from the police station,

precinct station. And she knew all the police, or they knew her. So she was permitted to operated this place in a residential area, where it really wasn't legal, but nobody bothered her.

Wilmot: Was this your idea, or your aunt's idea?

Bragg: I don't know. I don't remember there being any discussion. I probably was offered the job, and I just took it.

Wilmot: And it was a job that paid you?

Bragg: Oh, yes. I was paid two dollars a week.

Wilmot: Okay.

Bragg: Literally, two dollars a week.

Wilmot: Sometimes when you work for family, you know—that's why I was asking.

Bragg: Yes, well, sometimes family won't pay you.

Wilmot: Right. That's why I'm asking.

Bragg: In fact, I had a lot of experience like that with my uncle. He's a great guy and all that, but he paid the men, paid everybody else first. He wasn't going to let me starve, but you could suffer with him. [chuckles] But no, I don't know why. Maybe it was because I realized that things were getting tougher, that I took the job.

Also it may be that about this time, things got so bad that Aunt Edna let the designer go. People just weren't buying that many flowers. They were just buying food. She then became her own designer. She'd watched them and could do it, anyway.

That went on for a while. And then finally it got to the point where nobody was buying flowers, and we gave up the store, gave up the two stores and moved in rooms with an old lady that my uncle had once—[pause]—helped her somehow. She was indebted, you might say morally indebted to him. She had a place with a couple of rooms available, so we roomed with this old lady.

Maybe somehow that was about the time when this job made sense. Probably. That probably had something to do with it, because that did happen, and we went and roomed with this old lady. But I had my job. My two dollars were my wages. I got tips, of course. I even managed to buy—had a suit made, tailor-made suit.

Wilmot: In high school.

Bragg: Yes. It was a layaway. You know, you put down. You put some money in, and you go down and set up an account, and every week you keep putting money in, and one day you got enough, and he'd make you the suit. So I had a tailor-made suit in high school.

That was a very interesting experience, that job. I'd have to say that after you worked five hours, you're not too much into a lot of cracking the books.

Wilmot: No, you're not.

Bragg: And so I only cracked the books on things I really liked. Otherwise, I probably would have had a much better academic record in high school.

Wilmot: And when you say the things you really liked—?

Bragg: Math and science and English to some extent.

Wilmot: Are there certain teachers that you recall from that high school?

Bragg: A couple. One was one of the math teachers, who taught plane geometry and solid geometry. I think his name was Woods. Whatever the highest grade was, I got a plus on top of that from him.

Another one was a drawing teacher. I think his name was Stevens, who was known to be a tough guy. No nonsense. He cut nobody any slack. The drawings that I did in his class were good enough to get into a competition. I didn't win anything, but at least [they] were displayed in the school bookcase as "here's what outstanding students are doing."

Mostly I had good luck with tough teachers, who weren't operating on popularity contests. Woods was not, though. He was just a very nice guy. But most people were not taking solid geometry anyway. They'd cut off at algebra.

I don't remember who the trig teacher was. I only did fairly well there. I'm not sure why except maybe I just didn't do the homework. It's not that difficult, really.

And I did well with Mrs. Friedman. Mrs. Friedman taught Spanish. I guess some people gave—you know that you're just here on sufferance. That was the attitude I got from most white teachers.

See, I was used to, if I knew the answer and I held up my hand, I'd get called on and I would show how smart I was. But in these cases, I'm not sure. I held up my hand, and they don't see it, or I wouldn't get called on. And so you're not going to shine too much if they're not going to let you shine. That was mainly what I got. I'm not saying that people—well, it's hard to say if people went out of their way to ignore you, but you get a pretty good idea that your contribution isn't all that welcome if you know how it works otherwise.

Now, outright discrimination? I'd say I rarely could put my finger on it. But, what's the word? Benign neglect would probably be a better way to put most of it. Except there were teachers who, where you had measurable performances, like in drawing. You could see it. In math, the answer was right or it's wrong. So where you could do that, I usually did pretty well. And the tougher the teacher, usually the better I did.

Wilmot: Who was Mrs. Cagney?

Bragg: Mrs. Cagney was the lady that owned the tea room.

Wilmot: Okay. I was just looking at the outline you made. Her name was right after Tilden Technical High School.

Bragg: She was the lady who owned the tea room. Taught me a whole lot about the public, human nature. See, in this job I'm constantly waiting on people. The way it would operate: you would come. You'd ring the doorbell. It's like an apartment building. And I'd ask who it was. They said they wanted to come to the restaurant. I'd press the buzzer which would open the lobby door and then I go and let you in. Seat you, take your order, go back and take it to Mrs. Cagney, and then—.

In fact, I was the doorman, the waiter, naturally the bus boy, the dishwasher, and occasionally I'd do things like whip potatoes or make meringue for pies or whatever. So I learned a lot about food preparation, food serving, the idiosyncrasies of the public, and the interesting characters who came there. So it was a lot of big—very educational experiences for me.

The people who ate there mainly were middle class, who enjoyed the atmosphere of eating in the tea room, as opposed to something like a Denny's, you see. There weren't any black Denny's there, but the point was that it was sort of, you might say, shabby genteel. It tended to be schoolteachers or white-collar workers. Rarely would there be someone who came there who was a blue-collar worker. Some lawyers, not too many doctors but some, a lot of social workers. That was a common job for a college-educated person in those days. A few people who worked at the post office. A guy who owned a restaurant would come over and eat at this restaurant. [chuckles]

Wilmot: He didn't like his own food.

Bragg: Right! Also he wanted to get away, I guess.

But one guy owned a policy wheel. He was a gambler. One or two. There was a racetrack tout who would go out to the racetrack. The way the touts operate, they would tell you to bet on this horse, you to bet on that horse and tell others to bet other horses, and so on. And one of those horses is bound to win, so depending on which horse wins, you'll go—like they say, "Why don't you share with me because I told you to bet on that horse?" But he was that kind of a tout, you might say. [laughs]

Even people like the guy who was the corporation counsel for the City of Chicago came there. You don't put this in, but he would come there. Mrs. Cagney would occasionally rent rooms. She didn't tell me this. At a certain hour when the bell rang, she would say, "I'll answer the door." She would go and let that person in, and I finally realized, I finally saw what was happening. This was a very, very private—it wasn't even going to a hotel. People were going to a residence. I forget what the word is, but it's an assignation. [snaps his fingers and chuckles]

Wilmot: I understand.

Bragg: This particular guy was the corporation counsel for the City of Chicago. Very respected, married man, of course. But you never got to see him in any public situation. But I'm learning all this I'm still in high school, so it's very highly educational.

The back dining room had a big dining table, and that was fascinating because the regulars would come. They got to know each other. And they would engage in all kinds of political discussions and discuss the issues of the day. They're all very well read people. As I was saying, they're social workers and lawyers and even the post office people were typically college educated or almost that. So it was a high level of conversation that you would hear.

I remember guys discussing Lenin and—in those days, there were still—we're talking about the thirties; 1918 isn't that long ago. So Marxism and Leninism and all that kind of stuff is still very much in the intellectual air, you might say. So I'm hearing all this stuff, and I'm waiting on them, and it's just fascinating to be around these people.

And right down the street from Mrs. Cagney's—that was on Michigan Avenue, near 48th Street—at 48th Street and the corner of 48th and Michigan was the Hall Branch Library. That was named after George Cleveland Hall, who was the first person to do open heart surgery, a black. [claps his hands with every word for emphasis]. Of course, he was famous for that. This library, it was nice. And the librarians who worked there very often would come and eat at our place, so I got to know them.

So when I would get off, I would go down, if I chose to do so, to the library to study. They let me study in a room that was pretty much off limits except to scholars. And the reason for that was a lady who was the head librarian, who ran the place, her name was Vivian Harsh—I remember, a wonderful woman—she had made it her point to collect as much as she could, books and other items, by and about black people.

And so those books didn't get loaned out. You'd have to come there and read them. Usually I would just study in there, but from time to time I could read as well. So I had access to a library about black people that most people just never had access to, it just wouldn't happen.

Incidentally, Lerone [Jr.] Bennett, who was—if you've ever read *Ebony* magazine—he's written a number of books about—*Before the Mayflower [A History of Black America]* is the most famous one, perhaps.

Wilmot: That's the one I've read.

Bragg: But he has a big editorial position with *Ebony* magazine. He did all of his original research right there in that library, in that same room. I didn't know him, of course. But the quality of the collection was just that good. So that was fine for me.

And, of course, you would have lectures from time to time, and prominent people would come there, so you would hear these names, and I began to get a feeling for black people who were notable, who were not personalities like Joe Louis and whatnot. That would be a different kind of personality.

So that was Mrs. Cagney's, and that was a wonderful experience. I admired her for the things that she did. Her husband had come north from Mississippi. She was half white. Not that that is the issue. But Biloxi, Mississippi, if you go down there, you'll find that there's so many people. The miscegenation—I think that's the right word—had produced enormous numbers of not only mulattos but octoroons and whatnot. Just the place was overrun with them.

Well, she had been in domestic work down there, and she and her husband had come north to work for some well-to-do people in the Chicago area. But after a while, she became ambitious and decided, well, they would work as a couple. She would do the cooking, and he would do whatever else. It was a typical kind of thing that people did. People in domestic service, they called it.

Wilmot: Yes.

Bragg: Well, I guess coming up to this big boom and money's coming from everywhere—I'm just guessing, but that was probably the time when she decided, "Well, heck, everybody's making money. Why are we working for these white people?" So that probably was the background for going to the restaurant business. Because he never did quit. He remained a domestic, and she left him. "If you're going to do that, we might as well split."

She didn't have one dollar. [She did have one daughter?] But she had learned enough about dealing with the public. And, oh, she was ambitious. She subscribed to a trade magazine and would pick up little tips about restaurant management. Very ambitious woman, very smart. And a good judge of—knowledgeable about human nature, how to deal with people, how to treat the public and so on. Not cynical, but just down to earth.

Wilmot: Knew how to talk to people.

Bragg: Yes. So I learned a lot there. And, as I say, I had my pocket money and everything. So in that sense, I was not really a burden on my uncle and aunt, except they provided a room for me to sleep in. But for everyday expenses, the food and all that, from that point on, all that I took care of.

Wilmot: Did you have a good relationship with them?

Bragg: My uncle and aunt?

Wilmot: Yes.

Bragg: Oh, great! My uncle was a very lovable—very likeable guy, a great sense of humor, a sincere man. Honest, despite the fact that he'd been in jail for stealing a car when he was an adolescent. And also a first-rate artisan. He was very proud of being a first-rate plumber. He thought that to be a first-rate plumber was an achievement. Of course, he had gotten his plumber's license. Later, once he began to contract, he got a master plumber's license. And I think at that time he was probably the only black master plumber in Chicago, which is kind of a step up.

But back to your basic question. For a while, I was apprenticed to him, for a particular reason. But on top of that, he just stood in lieu of a father. He was the guy that ran the house. If issues came up that required a male hand, he took care of it. Otherwise, Aunt Edna was the one I answered to. And so we got along just fine. I never felt that I was anything less than their child.

They were proud of me. Whenever I did something well, they were very proud of it. In many respects, I got to know Aunt Edna better than I did my mother because I had left at age fourteen, I guess. Whereas from fourteen till the time I left to go off to the army, I lived with them.

Wilmot: Did you miss your brothers and sisters?

Bragg: At first, yes. But you kind of get over it. At first, I was kind of lonesome because I'm in a strange place and don't know anybody except my aunt and uncle. And I never did achieve the kind of infrastructure that you get if you stay in the same town, more or less, and the same place. The typical experience in the Midwest and the East, I guess, is that you're born in a particular town, and the chances are you grow up in that town, and do not change to communities too far away. By the time you get to high school, you have an enormous number of people that you know. So you just know a lot of people.

Well, if you come to a strange place and you didn't go to elementary school there, and on top of that, in my case, you go to a high school where most of the boys are white, you don't have much of an infrastructure to go on. And you have to kind of—that kind of evolves based on things that you run into contact with.

My uncle and aunt introduced me to a few families that had girls. Girls were becoming important at this point. And I met other people through family connections, I guess. But I guess it wasn't until I got into college that I really—a big explosion, because now we have girls there. Of all kinds. And so that social world has up to now been pretty narrow. I knew a few people. Didn't pick up much in the way of social contacts from high school. There were black kids other than me there, of course, but not many. The typical class might have one or two out of thirty or forty.

Wilmot: Do you remember good friends from high school?

Bragg: Actually, only one. And that sort of petered out after a while.

But the most important event in high school, that I missed mentioning, is discovering that I was nearsighted. And that occurred early on, and that was good. With my last name being Bragg and if you seat alphabetically, you're going to get seated very often very near the front of the classroom. And so the inability to see clearly on the blackboard was not that much of a problem. It's a problem, but you can squint and see it. But if you're in a big class and your name might place you back toward the end of the class, you can't see the blackboard.

And one of the teachers early on, in the first semester there, noticed that I'm squinting all the time. I can't see the blackboard. So she sends a note to my aunt to see about his glasses. Then I discover, "Wow! What is all this?" The first time I remember getting these glasses, and I could see the baseball over there. I thought I was just clumsy.

Wilmot: That happened to me, too, and I got glasses and I could suddenly see the leaves on the tree. Before, it had just been a big green blur.

Bragg: Yes. Then you know! That revelation! My God! They had been seeing this, all this. No wonder I couldn't play so well! No wonder! They hit a pop fly in the outfield, and I'd never catch it because it would be on me before I saw it. And it led to my wearing glasses, of course, and I've worn them ever since. I'm sure I was squinting down south, but people just didn't pay much attention to it. I have one aunt, I'm pretty sure she mentioned I squinted a lot, but nobody thought to go to the next step and doing anything about it.

Wilmot: I have a question, it goes back a little bit. When you first came to Chicago, what were your impressions of the city? Just the physical city, especially in relation to coming from Memphis, Tennessee?

Bragg: A whole new dimension. First of all, the style of the housing is quite different. In Memphis, people lived in houses pretty much, the Memphis that I knew. Rich or poor, you basically live in a house. Very few people lived in apartments. Mostly they weren't considered terribly desirable, either. Well, in Chicago, most people lived in apartments, and the typical apartment building would either be a four-flat or a six-flat. There's two to a floor, and three floors up. You walk up. And mile after mile after mile of these apartment buildings. That's the way people lived. That's the first thing.

The second is everybody seemed to have indoor facilities. I don't recall I had ever seen a place that had a privy outside. Maybe you could go out to a suburb, some unincorporated area, and see that, but in the city, that was the way it was.

It was big. The school buildings were bigger. The whole thing was a much bigger world. Well, it was obviously more crowded, and more people seemed to have businesses. Maybe that was again, a function of size. They weren't terribly exotic businesses. Typical neighborhood barbershops, restaurants, and stuff like that.

The first place we lived down the street north from the Owl Theater, which we went to every time the movies changed. There was a saloon on the corner. I think I mentioned this. Where the McCanns' father owned a saloon. There was a poolroom down there I didn't mention, and there was a little jewelry shop next door.

Down on the other side of us, there was a hair products manufacturer. The guy who owned the place was kind of a ward politician. He made pomade to slick the hair, and sold it to beauty parlors and individuals. His son's name was Fred Wall. Fred was kind of a big brother in that he was, oh, maybe five, six years older than me.

Fred was interesting. This is an aside. But he, of course, grew up—he went to Bethune-Cookman College down south [Daytona Beach, Florida]. Why, I don't know. But when he came back, he went into politics, running the office of Congressman Dawson. Bill Dawson was I think the third congressman from the First Congressional District in Chicago, who was, up to the end of World War II, the most powerful black politician in the country. Well, Adam Clayton Powell was probably in there somewhere, but Dawson was a powerhouse.

The First Congressional District was the same geographical area as the Second Ward of Chicago. Through ward politics and whatnot, blacks just ran that. Fred ran the office, which meant he sold all the jobs. If you needed your water turned on because the city had turned it off, he could fix that. So he became a real wheeler and dealer.

But to answer your question, Chicago was a bewildering place. It was more fun. For example, now I had electricity. I lived better. I had radio. I could listen to *Little Orphan Annie*. I forget who the other radio characters were. I had my *Little Orphan Annie* mug that I could make Ovaltine and sodas in. Unfortunately—this is an aside about Chicago, but—well, I learned something about how big cities operate. When the Democrats went out of power and Republicans got in power, they right away tried to make criminals out of all the Democrats. Not too different from today. [chuckles] And some charges were brought up that civil service jobs were being sold in Dawson's district, and Fred wound up being the fall guy. I'm sure he was the guy who sold the jobs, but he sold them for Dawson. It was not a new practice. They all did it. It was just that if you're on the outs and get caught, well, you're a bad guy.

Jack Armstrong, the All-American boy? These were things that were popular radio programs then. For ten cents I could get into the movies. I used to have to pay a nickel in Memphis to get into the Palace Theater, but now I'm getting more money, of course. Ten cents goes a long way. Right down the street from us was the Owl Theater, as I mentioned, and movies were the big entertainment. The movies would change on Sundays or rather, it's a new movie on Sunday and a new one on Thursday, Wednesday or Thursday. Saturdays there would be a serial.

Wilmot: Are there any that you remember seeing that made a really strong impression on you?

Bragg: One in particular was Buck Rogers.

Wilmot: Buck Rogers and Wilma.

Bragg: No, this is Buck Rogers in space—oh, Wilma? That's the name?

Wilmot: That was the woman.

Bragg: Oh, you know that one, then. All I remember is this music, "Ming, the Merciless" or whatever. They'd have these pictures of rocket ships, which would amount to a little model suspended on a support, and a little dry ice in the back that would shoot the steam up. But at any rate, that's one I remember. [chuckles]

There was always some kind of a western. I don't remember any offhand. Probably somebody like Buck Jones. I remember the Buck Rogers serials. That went on and on. But there would be a serial, there would be a newsreel, a comedy. Even in the places that didn't have vaudeville.

So that was right down the street from us, and on weekends we would have all that. What we would do was since we were right down there, close to the theater, and the prices changed at a certain time of evening—my uncle or one of us would go down and buy the tickets before the price changed, come home and have dinner, and go down together and see the movie. Well, the owner knew us so it was okay.

They even had ushers. I remember a friend at one time worked as an usher in there. And a person that just sold popcorn. And a ticket seller. All of this in a neighborhood theater. Now one person does all of that! But, of course, back then, instead of having twenty people you might have 200, so it was different in that respect. But also, ways were different. So that was Chicago.

We were right close to 47th Street. Forty-seventh Street is a major thoroughfare at that time, where the heaviest concentration of black businesses and whatnot were. From 47th and State Street going east, one went to Wabash to Michigan to Indiana to Prairie to Calumet to South Parkway. That's about a half of a mile. And there are businesses all along 47th Street there.

And at 47th and South Park, in that general vicinity, there were two movies. One was the Regal Theater, which was a huge place. All the big black enterainers would come through. I went to see, I'm sure, every one of them who were touring. Way back. Like, Ella Fitzgerald with Chick Webb. You could just come on up from that time, from that time forward.

And there was another one called the Metropolitan Theater, which was on the north side of 47th Street, which only had movies. And there were all kinds of stores along 47th Street. Actually, there was another movie house on Prairie Street, before you even got there, that would have double and sometimes triple features.

So that was the Chicago that I saw close by. For the longest, I didn't see much more than that, except when we would go out to the airport. I didn't have to go much further than a half a mile to go to Tilden. Till I started cutting school.

Wilmot: You were cutting school?

Bragg: I cut school a lot. Probably because I wouldn't have my homework done. And rather than go and show up with work not done, I just wouldn't go. So I would get up and take the elevated [train] down to downtown. Downtown would be Madison Avenue and Madison and State Street, where there was a concentration of movie houses, three of which had vaudeville. Anyway, there were so many people who were out of work, who didn't have jobs, vagrants, that theaters and the burlesque houses, for that matter, opened early, to accommodate them.

So I would go to the Palace Theater, which had good vaudeville acts. The Oriental had good vaudeville acts. And just about all the ones that ever became famous, I saw. Many of them, a lot of times. Certainly the black ones. And the white ones, too, for that matter. They all played the same places.

So that was the larger world that I saw in Chicago at that time, but only enlarged because of going to the movies. It didn't extend west. There was the beach, which was segregated, and I'd go occasionally. But that was pretty much it.

Oh. Dancing lessons.

Wilmot: Dancing lessons.

Bragg: Yes. While I was still in Memphis, I picked up a little tap steps from first watching the entertainers tap dance. There was a young guy in the neighborhood who could dance a little bit, and he taught me a few steps. So when I got to Chicago and was making my own money, I decided I wanted to learn more, so I started taking dancing lessons. The guy—his name was Sammy Dyer, D-y-e-r. Yes, Sammy Dyer. Sammy had this dance studio, and he also produced the shows for a couple of nightclubs. Mainly he would do the choreography for the ensemble numbers.

Well, of course, girls would come out, do their thing. Sammy would create these numbers and teach them. Dancers just kind of hung out at his place, they would drop by. Whether they were—now, they might be feature dancers. He didn't teach them, but they might help him teach a class or something.

But I was taking private lessons, I guess because of the timing. The time when he would give the lessons, the group lessons, I couldn't make it. To this day, I don't know how I could afford that, but I did. Unfortunately, I didn't have much talent [laughs], so I took lessons. I learned a few routines and all that. I can critique dancing pretty good, but I couldn't do it that good.

Wilmot: Well, I think it speaks to a lot that you actually signed yourself up because you enjoyed it so much. That's pretty exciting.

Bragg: Yes. Oh, yes, I enjoyed it.

Wilmot: Earlier you mentioned that you didn't really encounter a strong nationalistic race consciousness until you came—

Bragg: In the South.

Wilmot: —until you came to Chicago.

Bragg: Yes. Yes.

Wilmot: Now that we're in Chicago, could you tell me a little bit more about that?

Bragg: Yes. Somehow I wound up in the Youth Council of the NAACP.

Wilmot: Okay. Somehow.

Bragg: I don't know how that happened.

Wilmot: Okay.

Bragg: Obviously through some friends, some acquaintances.

Wilmot: While still in high school.

Bragg: Yes, right. I became a member, of course. It struck a chord. I'm aware all along that in Chicago at that time—well, what we have is an economy that's just flat. People are out of work. They're being put out of their homes and whatnot. Initially we've got remnants

of the laissez-faire era. Roosevelt has just come in, and every time he tries a new program, they try to either declare that the law is unconstitutional or something's wrong with it. Roosevelt wasn't always that popular. He got things done, but by no means was he that well liked by everybody. That came later.

So you had things like strong radical movements like the Communist Party, who were actively proselytizing the downtrodden. They would win Brownie points by, for example, it was quite common for a landlord to just send somebody in and, if you didn't pay your rent, put your stuff out on the street. And the Commies were organized to come and take it back in. [chuckles]

Well, that made a big stir. So that kind of defense of the downtrodden probably led a lot of people to become sympathetic to the Communist Party, without any concern for ideology. They just thought, "Well, this guy's on my side." And so I think they got a lot of converts that way.

Wilmot: That's very interesting for me to hear because in my lifetime, it seems to me that Communists and communism in the United States has been shown as just very marginal or existed in a very marginal way, and so it's really interesting to me to think that there was a time when it was much more mainstream.

Bragg: Oh, yeah! In the sense that it was the voice that spoke to the needs of the downtrodden, and so that meant that in the same way that we, not deify but demonize [Fidel] Castro, Castro's Communism and all that, that was against the status quo. The status quo was, well, you may be out of work, but that's tough. That's basically what it amounted to. In particular, on top of all that, you've got measures that go beyond just what the common theme is, and that is you're in Chicago, and it's integrated and all that, but you still are a second-class citizen. And you're still black. You recognize this almost everywhere you go. No matter what agency of government or society you approach, you are still black, and you'll get treatment that goes along with that.

It was a long time, for example, before you would ever see an article in the newspaper about a black person that wasn't about a criminal, with a picture that's showing Jimmy Horton or whatever—I don't know if you remember this. The thing that did Dukakis in—well, I'm rambling now, but the point is that in the press, which was the important medium, of course—black people were basically a cipher unless they were criminals. Nobody ever did anything meritorious.

Understand, baseball hadn't even been integrated, so basically you were clowns. You were never quite up to, quote, "us." And so we now have these people who will jump to your defense. There had been cases like the Scottsboro Boys, which you may have heard about. Famous case where the Communist lawyers went down South to essentially—

Now, they've got their axe to grind, but if it's helping you and you feel that you're oppressed and your cause is good, you're not too concerned about whether or not other people don't think you're so hot. He's helping you, and so that was why they, the Communists, were able to gain a measure of credibility amongst poor black people. Outright, of course. And probably sympathetically, even if they weren't poor.

Wilmot: How would you quantify that measure.

Bragg: Numbers?

Wilmot: Not numbers, even just approximately. Like, in your circle, how many folks out of how many folks?

Bragg: Of the people that I got to know well—and I got to know them well because I liked them and we sort of thought alike—the only one I got to know two people who were out-and-out Communists, black people. Now, most of them had similar views about right and wrong, but politically didn't see Communism as something they would agree with.

So when the time came to talk about dialectical and historical materialism, they would kind of tune out. That didn't matter. But when it came to getting put out on the street, that was another matter. Then you had common cause. So I would say that it was bread-and-butter issues that the Communists attached to, and they brought an ideology along with it that wasn't that successful.

But to the extent that things that would have gotten swept under the rug got play, you really have to thank the Communists for doing it because nobody else was doing it. Now, that's going too far, because I'd have to say that the NAACP played the role of the super-radical organization then. Not as far left as the Communists. Certainly not preaching the Communist version of what an economy is like. But when it came to issues about human rights and so on, there would be a more or less common cause.

And, as I say, I did join the Youth Council, and I think I have been a member of the NAACP ever since, one way or another. Now I'm a life member. Which means I paid for a life membership. They still ask me for more money! [laughs]

And it turned out that the people that I got along with best had similar political ideas. We would do things like—I don't remember if I participated in this, but—a boycott of the re-showing of *The Birth of a Nation*. The thing is so wrong! Well, if you understand what *The Birth of a Nation* was all about, and the vicious propaganda that did so well. Why show that at all without some indication that it's totally wrong, that it's libelous? So, to protest things like that. Or wage inequity or unjust firings. Things that we still protest, except then they were so overt and so widely accepted that even to raise hell about it was considered to be radical.

So in that sense, you can say I was kind of a closet radical. As I say, I joined the Youth Council. You could relate to those people. They had serious ideas about issues. They often tended to be creative people, too; that is, artists, writers, for the most part.

Wilmot: Who was in this circle?

Bragg: Circle I didn't have. Are you talking about the Communists or just people that I knew?

Wilmot: The artists and writers that were part of your group and thinking progressively?

Bragg: The people I knew—let me put it this way. Coming from out of town and also being rather young, I tended to be a sort of the young hanger-on that more serious people tolerated but didn't buddy-buddy with me. So that some I did get to know fairly well socially. As far as activities in the NAACP, I don't remember any particular people who were members. I just remember I affiliated and I probably did little projects one way or the other.

But the greater collection of people that I wound up spending a fair amount of time with were people who were not particularly political except—. It's strange how that happens, because I probably met them in similar surroundings. Probably the most famous one is the founder emeritus of the Du Sable Museum of African-American History and Culture in Chicago. She was an artist. I guess I met her through another friend. She's dead now, but she was the first black to win the Pulitzer Prize for poetry. Her name is Gwendolyn Brooks. I met her because her husband was Henry Blakely, who I met through his brother, Julius Blakely, who was a classmate of mine at Tilden. [laughs]

We eventually wound up, Henry and I, at the same community college for a couple of years and got to know—. He was a very articulate, very brilliant raconteur. Unfortunately, when he wrote, he became stilted. If he could just have written like he talked—he was just brilliant.

So it was through guys like Henry that I got to know writers, or at least hang around them. And wherever you find writers, you find artists and sculptors. Ever so often you might find sociologists, anthropologists, that whole social science phenomenon. From the arts to the social sciences is sort of a continuum.

Most of them, I'm sure if I saw the names I'd recognize them, but basically that was the realm that I wound up involved with. I'm not sure I answered your question.

Wilmot: I asked you some other questions that distracted you from my original question. My primary question was I wanted you to talk about race consciousness in Chicago as you encountered it, and what it meant for you.

Bragg: Okay. I don't think there's a single act that you can perform that doesn't involve race consciousness, for black people, and certainly in Chicago it was there. It didn't sit on you like a plaque on your chest, but there's very little that you could do that didn't involve it. For one thing, the environment that you're in is dominated by white people who control it. The grocery store is owned by a white man or a white corporation. You might have some black clerks in it, but virtually all the stores on 47th Street, all the good locations, were white owned. At times, black [people] couldn't even manage to rent them.

Now, how that happened, I don't know, but the reality was that 47th Street, which was the big street at that time, and other lesser streets—there would be little mom-and-pop places here and there that didn't cut too much ice, but by and large, everywhere you looked, everything you did, everything you had to buy, you went to a movie, you went to a grocery store—unless you went to get your clothes pressed or your barbershop, just about everything else—to go and buy a car or you go on the streetcar, the conductor is white. At that time.

It's hard not to feel that race isn't an issue. You go to school, and you're considered to be, you're assumed to be stupid. As I say, I never took that to heart, so I got a reputation of being a little bit uppity. By that I mean a lot of teachers didn't feel—I got punished for it, too. At the end, they had the final say what my grade was. [chuckles] Some of those bad grades I got, I didn't deserve bad grades.

Not everybody is like that, so don't get the wrong idea. I've had people who went out for me, but my point is that anybody who would say that he grew up in Chicago in that era, and probably even now, who said race was not a serious issue that permeated everything would just be either a liar or stupid. You know it does.

Wilmot: Do you feel like you always had the tools to kind of name what you were seeing around you, or did you get the kind of tools for naming the political framework for it from involvement with the NAACP, or was it something your family discussed at home, your aunt and uncle?

Bragg: Well, the NAACP, of course, was a very important one because what we have is the legacy of W.E.B. Du Bois and all that went with him, and the *Crisis* magazine, which was a very prominent organ for essentially presenting the black aspirations and striving for equal rights, what he called manhood suffrage. But the black press did the same thing. It might not have been as strident. The NAACP eventually fired Du Bois for being too strident. [chuckles] But the black press was pretty much the same way. It didn't spend too much time saying, "Woe is me," but you'd be hard pressed not to get the impression that it was a white man's world and we're not equal partners in it.

Wilmot: Okay. It is one o'clock. In your outline, we are to go to Woodrow Wilson [Junior College], and I'm wondering if you want to begin that. I think maybe it would be okay for us to stop now.

Bragg: Let me see if we've finished Tilden. [phone rings] I think we pretty much finished Tilden. The only thing in terms of my record at Tilden was, despite everything, I wound up with about the top 15, 16 percent of the graduating class. Despite working, I managed to participate in some school activities. To this day, I don't know how I did that.

But I was in the drama club. First of all, to have plays with only boys in it is already a restriction, but to have plays in which you cast black characters which are all boys is even more difficult. I remember another guy and I, a black guy. That year we had two plays. Each one of them had butlers. We both played butlers. [chuckles] I was never going to play king of anything!

Wilmot: So they did it to you.

Bragg: Well, nobody thought anything about it, you see? Why would he be anything else?

Incidentally, my school at that time, when I arrived there, I think Ralph Metcalf, who ran second to Jesse Owens in the Olympics, was our star athlete. Nevertheless, it was the natural order of things that if you're going to cast realistically and you're going to have white actors and black actors in the same play, the black people are probably going

to either be thieves or something like that or they're going to be butlers. They're aren't going to be running things. So I played butlers. [laughs]

Because of the large number of black students—by large, I mean relatively large; we might have been, oh, 5 or 10 percent of the school population— when the time came to have the prom, at that time, usually hotels downtown would be where they'd have the annual prom. A big deal. Except that all the hotels were segregated. So now how are we going to accommodate this class? The black guys of course are going to bring black girls, but the dance is going to be integrated.

Incidentally, two years later, we went through the same thing at junior college. That's another story, though. So what they did is to just decorate the school gym, and that way get around the problem of segregation at the downtown hotel. There had been a number of incidents where students who arrived there were told to go take the freight elevator, the black ones, which was quite common at that time.

But that was my career at Tilden. I thought it gave me a good leg up. I never felt I had an inferior—. Well, Tilden was a powerhouse. It was all boys. At that time, a girl who had a Tilden sweater from a boyfriend who was a Tilden student had a prize. They were the kind of guys that were nice to have.

Wilmot: So you were a prize.

Bragg: Not me, because I had not lettered in anything. [laughs] But even so, you had to score above a certain level in order to get in there. There were three such schools in Chicago. There was the Lane Tech on the north side, where Cab Calloway went to school (not at the same time). And then there was Crane Tech on the west side, where a lot of Jewish guys went. And there was us. But Tilden was not only a powerhouse in most sports—they were up there near the top all the time. It was not a bad place to have gone.

And when I went to that community college to register, I didn't realize that most of the black students (who came from Du Sable and Phillips) were put into kind of remedial reading, bonehead English classes. I never was. And the reason was, the presumption was the academic standards at Tilden were higher, so you didn't have to qualify for anything. They automatically put the black students in the remedial classes. There were some white students in there, too. But I was never in a class like that.

And I didn't realize that until years later that that's what they did.

Wilmot: How would you say, in terms of the composition of the boys that went to school with you, what kind of economic background?

Bragg: Where did they come from? What kind of guys were they?

Wilmot: Yes, where did they come from?

Bragg: They were mainly immigrants or first generation Americans.

Wilmot: And in terms of economic background? What countries did they come from?

Bragg: They were mainly middle Europeans. You see, Tilden was on the west side of Chicago, which is where the stockyards was over there, but we had Italians, a few Greeks, lots of Germans, Poles, Lithuanians, that part of Europe. And so I grew up being able to pronounce names like Fialkowski or Liebowitz, just like I could say Smith or Brown or Jones, because that's the way the names came out.

But they were mainly blue collar rather than white collar. Their parents already had come over. Chances are, another language might have been spoken in the home, but these are bright kids, for the most part, who were headed to go to college. That pretty much sums it up. That they were immigrant—they were second-generation Americans, who were from mostly middle Europe. I don't think I ever saw an Englishman there, for example.

Wilmot: Okay. My last question before we close for today is: was there always the expectation that you would go to college from high school? How was college treated, either in your family or at school?

Bragg: It never was really discussed in detail. Just sort of assumed that I would go. No plans were made, however. In other words, nobody planned anything. It was just expected that somehow I would go on, which was foolish, of course, because you got to have money! When I graduated, there was no money. Even two years later, there wasn't any money. It might have been possible to do it regardless. I think it depended to some extent on the individual initiative and things like that. My record wasn't that bad. I was admissible to the University of Illinois at Champaign-Urbana as a student, but I didn't have any money for room and board to go down and stay there, and no relatives to go and stay with.

So it was expected that I would go to college. My aunt, after all, had gone to college, and my uncle had encouraged me to go into engineering, but the how-to was never really discussed, and so coming up to the last minute, all of a sudden here's college and I don't have any money. So the answer was, well, go to the community college because it's free. That's a great idea. And a lot of students did go on to four-year colleges after that.

Wilmot: So in the high school was it kind of—

Bragg: I see what maybe your point is: Was I counseled about college? The answer is no.

Wilmot: Or just was that the expectation amongst your high school peers?

Bragg: Nobody—I don't remember a single teacher talking to me about college at all. See, I never had a black teacher in high school. When I left the South, I didn't have any black teachers. The only black lecturer I ever saw was W.E.B. Du Bois. I'm talking about all the way through graduate school, from community college through four-year college, high school. I didn't have a single black teacher from the ninth grade on. And Du Bois was just a special lecturer. He came through and lectured our, sociology class, one time.

Wilmot: At your community college?

Bragg: Yes.

Wilmot: Now, let me tell you. This machine is going to shut off by itself automatically in a minute and thirty seconds.

Bragg: Okay. I have to stop?

Wilmot: We should probably close for today.

Bragg: Okay, fair enough.



Bragg siblings, 1939: Nadine, Robert, Pauline Alberta, and McFarland
photo courtesy of Robert H. Bragg

Interview 3: June 27, 2002

Wilmot: Okay, so tell me about this trip to Brazil.

Bragg: It came about in one of those—it was an organized tour, and the particular theme of this one was The African Legacy in Brazil. What it attempted to do was to look for the survival of Africanism in Brazil, those things which not much absorbed into the general culture, i.e., also the survivors that have escaped assimilation or somehow avoided it. It was organized by a tour group in Silver Springs, out of D.C. There were about twenty of us.

We went to Rio [de Janeiro], where we did the standard touristy things for two or three days, which was nice, but I had been there before, so that wasn't a big deal for me. Places like Corcovado—we never went out on Sugarloaf Mountain, but I had been out there years earlier.

We saw things also that you would not see on an ordinary tour because they were more toward indigenous blacks, like Mangueira, which is the most famous Mardi Gras group, I forget what they call them in Rio, but groups that do the samba and all that?

Wilmot: Yes. Samba schools?

Bragg: Yes. They have a big school there. A huge building in a slum. And pictures of all the champions and the backers, who look like gangsters, black gangsters, and the beauty queens. But you would never see that, I don't think, in an organized tour of Rio. So we saw things like that. Museums that had lots of survivals of early African influence. The religion, the Orishas of the Yoruba and so on. So those are things that we saw that you wouldn't see on a—

Wilmot: What did you like most about your journey there?

Bragg: The papaya.

Wilmot: The papaya?

Bragg: [laughs] I'm only kidding, but the fresh fruit is just unbelievable, in terms of its abundance, for us, at least, wherever we went. We went to three different towns, and we made stops in each place. We were in fairly good hotels. I was impressed. The service was quite good. It was quite different from what the typical Brazilian would see, of course. We were in rather upscale hotels. But, as I say, the food was very, very good, and I wasn't surprised at that because I had been there before.

When I joked about the papaya, I guess I've got the right one. It's the one that's kind of an oblong fruit. It looks like a potato. It's got a seed. It's a flat seed. I had it in Africa, too.

Wilmot: Is that a mango?

Bragg: Mango! [claps hands] Not papaya. Mango.

Wilmot: Papaya has many seeds in it.

Bragg: Yes. No, it's mangoes. Here, it's hard to get a fresh mango, and there it was just—totally peeled and everything. But otherwise, lots of other fresh fruit, too, but I remember that in particular. [laughs]

But other than that, the thing that impressed me most was sad. Because we visited—after Rio, which is a finger-poppin' town, you could find slums there that looked just like [hits table as he tries to remember]—what's the movie? I'm sure you know the one I'm thinking of. It became a cult movie, with all those beautiful songs [by Antonio Carlos Jobim and Luis Bonfá].

Wilmot: *Orfeu*. [known in America as *Black Orpheus*]

Bragg: *Orfeu*, yes. So you could find shacks like that all around. Surprisingly, despite the enormous amount of integration, you could find really black people there, still, who look just like they're right out of Africa. But as I said, what struck me was that the level of progress, you might say, coming out of slavery, that the Brazilians had is, despite the romantic notions we may have, they're behind us black Americans.

An enormous amount of integration, mind you. You'd be hard pressed to find Brazilians who don't have some black ancestry, from what I was told, and you see it. If you look at the Brazilian football team, just look at the skins on those guys. Practically all have tan—and they probably say they're not Africans, but they probably wouldn't dispute it, either.

But my point is that you find that's quite pervasive, and that's why I think they have such beautiful women and handsome men. But also you can find in the *quilombos*—and if you're up on the history, you know that means the runaway slave camps. We visited several of those. And there, the awful truth hits you, in a little compound.

I saw villages like that in Nigeria, so, again, I could relate, you might say, the degree of progress they had experienced by being able to relate it to what I'd seen in Nigeria. In rural Nigeria, that is.

But this particular little town, a little camp really, like, didn't have electricity. The buildings like they'd been made out of mud, houses just like I'd seen in Nigeria. There was sort of a meeting hall that they had built that had one or two classrooms. Fifth grade was the highest level that place afforded!

There was a water supply location—this is the first one we visited—that had about six cold-water taps. It was fresh water, of course. They'd gotten a grant from someplace to build a tank, so they had good pressure and everything. But that's where people got their water. I didn't go in any houses, but you know the waste was probably out in the back.

To go further, we came out in a bus from Salvador. We had to go a fair distance and then get on a county road to get up where they are. It's kind of out in the woods. Naturally, they know we are coming. A social worker who dealt with an agency of the government that had to do with the rural blacks—that was his function—but they welcomed us, of course, and I think served us maybe a little tea or something like that.

But as part of the welcome they did a little dance. What they did was build a fire, and the purpose of the fire is to tune the drums. See, they do that in Africa, too. The drums are made of wood. They've hollowed out some wood. Not that they couldn't have got more modern drums, I'm sure, but—but they would heat these drums. The point is, when you heat the wood, it expands. That's the equivalent of when you see a modern-day drummer, instead of expanding it, he tightens it. But it changes the volume, in other words, and that changes the resonance frequency. So they tuned the drums that way.

And we just sort of danced around this fire and everything. Being the eldest in our group, I had to dance with the oldest lady in the village, which meant we just sort of bounced around a little bit. [chuckles] But they were very welcoming. But the thing that struck me was that here in 2001, here are people out in the *quilombo* who have very little prospect of going much further than where they are right then as a common laborers. And they are so far removed from anything, that even to get over the fifth grade—it's quite a treat to get out of there. We had to go through kind of a dirt road to get in there.

They are proud of their ancestry and all that, but I had very mixed feelings about that pride being poorly placed. Now, that wasn't the only *quilombo* we visited. We had one experience there that got me a job I didn't want. It turned out that, with the exception of a couple of white people, all of our tour group were black. Black pride and all that. Some more rabid than others.

One white guy was a reporter for the San Jose *Mercury-News*. He was the religious reporter for the *Mercury-News*. He was a very interesting guy. And the other one was a white woman who was a dance teacher. She was there to pick up on dance stuff and so on. But anyway, we visited that place.

And there was one guy who probably taught evening courses in black studies somewhere. In fact, I think he did. That's why I say that. The sort of guy who comes on with "We're brothers" and all that and "How can we help you?" It got translated because they didn't all speak English. But the answer that came back was, "Well, we need some money to pay off a debt that the village had." It was thirty thousand bucks or something. Maybe it was reals, rather than dollars.

They had some projects in mind. One had to do with building a water line or something that they wanted, but to get another loan, they needed to clear up that existing debt. I don't think a formal commitment was made to pay that off, but it was more or less implied that we would do that. That was hastily done because not everybody agreed that they wanted to do that. Not out of lack of sympathy, but whether or not that was something that we should jump in and pay off.

Well, the night before we left to come back to the States—we are now in the last area, São Luis, in the north of Brazil, way north on our itinerary—we discussed the issue, and it turned out that for about, oh, \$250 a head, we could pay off that debt, so maybe it was around \$3,000. Which is not a lot of money, and if you're really that sympathetic, why, you could find a way to do that.

And so we held a kind of a vote. Secret ballot. Having no way to resolve the issue at the point, we had to decide, well, how are we going to do this? I was the oldest and the

loudest, so I got stuck with the job of essentially resolving what we were going to do, which meant take all the ballots and come back with a report on the consensus and a recommendation what to do next.

So it took me a whole year to finish up the job, which finally came down to not everybody was ready to cough up that much money. Most said, "I don't have a problem with the amount, but is this the best way we can spend the money? How did they get that far in debt? How do we know if—after all, they're fairly ignorant people. How do we know that they're going to spend this money wisely and [not] get right back in debt?" Or "If we do this, will we have to go the same thing to every *quilombo* we ever see?" And so on.

So there were questions about whether or not—I thought they were legitimate reservations. Well, the next thing was to get answers to this question, "Well, how do we send—where do we send them money, and who's responsible? Who's going to handle the money down there?"

Well, to answer these questions I first tried the tour organizer, who then directed me to our local guide, who had been our guide in Salvador but also had the local contacts in São Luis. And then Carlos, I think it was, who was the local social worker. And I wrote each of them in turn and never got an answer from any of them, answering these questions.

Well, finally it turned out that I had an American friend whose father was a Brazilian, and had kept contact with their family down there, and they had one relative who was a now-retired professor from one of the technical institutes, so I talked to him on the phone and asked him to look into it. He never did answer the questions, but he came back the result that, "Well, if you want to send money, here's where you send money and it won't be stolen," and so on.

So I finally got rid of that job. But the point was, I visited several *quilombos*. They were at different levels of sophistication. Another one was much bigger. They had cars around and everything. They also built a fire, and we had the dancing. The same things at the other *quilombos*.

When we arrived, one guy took some material—it was like palmetto but basically it's like cane or palm. You just cut it into a lot of strips. You've perhaps seen cane-bottomed furniture. And while we were there talking and singing and everything, he made a basket. It took him about, oh, thirty minutes, I guess, maybe a little bit less than that, but he had made a basket while we were doing that.

We applauded that, and I did, too. But, by the same token, well, this is 2001, and here's a grown man in if not first-world, at least a second-world country. That's hardly an achievement. It's not going to sell for very much. Their chances of doing better are very, very small.

So my overall impression was that I was impressed with the food and the beautiful scenery and stuff like that, but also impressed that the, quote, "equivalent" civil rights movement hasn't been anywhere near as successful in Brazil, despite all their protestations that there's no color line. I mean, economic turns out to be color, when you

get right down to it. It's as simple as that. If you're black, you're going to be poor. And they don't expect you to be smart. You can sing and dance and all that, but don't—.

Well, it turns out that the school system there is mostly public, but you have to get up to the advanced level to get into the school system, so it's like here before we had the Land Grant Act establishing the public colleges and whatnot. Unless you had money enough to get through high school, you would never get to college anyway.

So in a nutshell, I enjoyed it. I would have liked to have seen more in this tour about why they were there in the first place, because I'd read a lot about the slave trade and the great economic pressures that caused these things to happen. And in Brazil, it was sugar. When they discovered in the Caribbean that you could make sugar, well, the people in Europe had never had sugar in any appreciable amounts. Now they had cheap sugar coming in. By God! Here's a gold mine. Forget the gold. Sugar would make much more sense. And in the Caribbean, they would bring in slaves and work them until they died. Men. Very few women. And so that Caribbean culture developed into a slightly different—. I'm sorry, I've gotten off of my story.

[Phone rings. Answers phone. Interview interruption.]

Wilmot: Good morning. It is the 27th of June. I'm here with Robert Henry Bragg, and this is interview number three.

Okay. So the last time when we were speaking, we kind of stopped at the end of your high school years, so we were going to start off talking about how you went to community college and what that experience was like for you.

Bragg: I went there because I didn't have the money or whatever to go to any college, I thought, any four-year college. I think I actually applied at the University of Illinois and was admitted, but I couldn't take that up. That was at Champaign-Urbana, out in the center of the state, equally remote from anybody except the local people. But there were three community colleges in Chicago at that time. The one closest to me was Woodrow Wilson, what they called Woodrow Wilson Junior College, now Kennedy-King College. Not too far distant. I could reach it by streetcar fairly easily.

As I mentioned earlier, I hadn't had an elementary school education in Chicago. Also, the high school I went to was practically all white boys. So I didn't have that much of a black ensemble of friends. But I had met some people who went to the other schools, and for the most part, they were going to this community college, the ones I was closest to.

That's the first time I'd heard of it, but I applied, was admitted, and spent two years there. During the last year, I was on the student council. In terms of activities, I was in the tap dance club. I mentioned my tap dancing. I was on the prom committee. Had an interesting experience there. I don't know about drama. Maybe there, too. But also the science and math clubs, of course, would be of interest to me.

The big deal was the discovery of women. Girls, rather. That was nice. Enjoyed that. Academically, I did very well, again, where I chose to do well. I think I still had a little late [night] job. I don't remember exactly how I survived in terms of money, but I must

have gotten some help from my uncle and aunt. But I was able to go there and could do the things that everybody else did.

There were only a few things that stand out in my mind about the whole time I was there. One was the experience I had in English. At that time, the junior college curriculum was a set of about five survey courses. This was supposed to round you. So one had to do with English; another one had to do with the social sciences; another one had to do with the biological sciences; and there might have been one that had to do with the humanities. I think in three of those you had to have a two-semester sequence. One final grade covered the whole thing rather than interim grades, although you did get an interim grade. The English course came first. I remember being in this class with this nice little white lady, the black kids just loved her because she praised them.

Somewhere along the line, we had to write an essay on something. I forget the situation. And I chose to write an essay on how to wipe a lead-pipe joint. Now, most people have no idea what that was all about, but I could write about it. I had a lot of first hand knowledge, because my uncle was a plumber and I'd worked summers with him. I hadn't dwelt on that as we've talked earlier, but at one time I was apprenticed to my uncle. During the summers and weekends and things like that, I would work with him on the job. I had seen him do this job, which is a craft.

But I knew it backwards. I knew exactly how to do it, and so naturally I could write an essay about it. And she gave it back to me and put an F on it and said, "You didn't write this. You couldn't write this." I said, "What do you mean? Of course I wrote it." I think she gave me a C or a D or something like that for the course. In other words, "This black kid—I don't care who he is, there's no way he could write that essay."

Well, that taught me something about white folks that praise you. As long as they're going to give you a C and praise you, that's fine. But if you did something that didn't seem to fit the mold, then you couldn't possibly do that. So she was going to flunk me. So that was a pretty bitter experience, that semester.

Incidentally, I didn't mention it, but during my senior year in high school, coming up to graduation, there was a competition for the yearbook at school. Did I mention that?

Wilmot: No.

Bragg: Well, one of the competitions was to write a short story. For that, the prize was to get the yearbook. So I didn't have that much money, so I wrote just to win the prize. And I won it. I told you I was pretty good in English. I had read a lot. Good vocabulary, good grammar. And so it shouldn't be too surprising that I could write well. But she didn't know that.

Wilmot: If you recall, what was the short story about?

Bragg: It happens that I got a copy. If you want to stop the recorder, I'll just bring it.

Wilmot: Okay.

[tape interruption]

Bragg: I don't remember the woman's name. All I remember was the black kids thought she was the greatest thing going. She was so nice. But they all got C's. She gave me an F for something like that, and told me I couldn't possibly have written that. I said, "Well, look, give me another topic. I'll write about that." But she wouldn't take that challenge. She was just comfortable with the "fact" that I couldn't possibly write that well.

Luckily, that was the first semester of a two-semester sequence. The second semester, I happened to sign up for 102, and the guy's name was Mr. Daugherty. I won't forget him because he had a scowl on his face when you came in, and he addressed the class more or less like this, that "In this class, you're going to work, and if you don't want to work, you might as well get out right now because that's what it's going to be like," and essentially, nobody was going to be cut any slack.

Well, that was the first day, and the class enrollment dropped by about two-thirds. The next meeting of the class, all of the humbuggers had left. We had a great course. It turned out he wasn't all that bad at all. He was tough! But Mr. Daugherty thought I was the cat's meow. I wrote well. He said, "Well, we're going to illustrate this point about satire. Mr. Bragg, read your paper to the class." Which sort of reinforced what I already knew, that I could write pretty good. [chuckles]

But the point was that here's this guy who was reviled because he was so mean and tough, but he was fair. And the sweet little old lady that gave all the black people C's was considered a wonderful person, but obviously was a racist. So it taught me a lesson about what to expect about what's behind the smile that people give you. It doesn't always mean that they're your friends, or even that they respect you. If you're praised for being just ordinary, if you're black and ordinary that's patronizing. That's an awful standard. So Daugherty was quite a lesson to me.

[Interruption: Bragg's brother enters and there's a brief discussion about food.]

Bragg: So that was fairly important.

I did well in the technical subjects. The social sciences, about the only thing I remember there was I learned a lot about the lingo and the difference in lecturers. One lecturer, Mr. Kennedy, lectured in such a way that you could use the Roman headings and then Arabic—you know, the capital letters, and you could diagram as he lectured. He went right down the line. Most lecturers are not that organized.

But in this particular class, we had one lecturer that I remember, and that was W.E.B. Du Bois. I knew who he was, of course. I'd seen his picture. I had never met him personally. He had been editor of the *Crisis* magazine, NAACP, editor of the first *Crisis*.

He gave a lecture about the myth of noble ancestry that Americans have. The point was that the stuff that we'd been told is that all of our ancestors were noble people who came here for noble reasons and all that, but the fact was that most of them were thieves, the scum of European society. If not scum, somewhere down near the bottom. The women weren't necessarily all of great virtue either. In fact, quite often, the opposite. And Georgia was settled with convicts! And it was so obvious, once he laid it out there! You

thought about it. Well, why would anybody who was doing very well in Europe want to come over here to a very uncertain future?

But anyway, the other thing that was unusual about the lecture was when he finished, the class got up and walked across the stage to shake his hand. There must have been 200 students there. In other words, he was just that impressive a lecturer. Never heard him speak after that. But that was very impressive to me.

The humanities, about all I remember about that was that most of the stuff we were supposed to have read I didn't read, and subsequently little by little did read and found I should have read it in the first place. [chuckles] The classics. Some stuff wasn't all that hot. It was topical and transitory. But most of it was good stuff.

Wilmot: Who was at the community college with you? Who were the other students?

Bragg: That I remember?

Wilmot: Not so much by name, but generally was this a school that was, as your high school, geared towards folks who were new immigrants? Were people affluent or not affluent? What was their academic background?

Bragg: They were all probably the same—well, ethnically there was no emphasis, as far as I can remember. We constituted about 15 percent of the enrollment. Blacks, I mean. Not much more than that. Maybe 15 or 20 percent. We were on the south side, which meant that the white ethnic mix on the south side would have been what dominated the scene. There was another one on the north side, and how ethnicity played out there, I don't know. But there was nothing that stands out in my mind to say they were mostly Poles or Italians or whatever, whereas in my high school, that was fairly narrowly grouped in middle Europe, with a few Italians and Jews and so on thrown in. But there was no outstanding—it was mostly white people and black people with blurs in there.

There's an interesting story behind that, which I might as well tell to you. We're hopping around a little bit. But every year they had an election for the class president. We might have been grown to 30 percent or more. One of our classmates, or several of them were kind of politically savvy, politically—yes, savvy is the right word. Decided to do what white people often did; that is, get behind one candidate and allow other constituencies to dilute their vote by voting for their own person.

So this time, we decided to support one black candidate for each office. And the upshot of it was that a black candidate, a black girl, won the class presidency. That was such a shocker that the authorities declared that there had to be a co-presidency. So our class had a co-president, who happened to be the white boy who didn't win. How that was explained, I don't know. But we understood what the real game was.

The next thing in that same vein—normally they would have a prom. The school prom would be downtown somewhere in a big hotel. I happened to be on the prom committee. How I got on that, I don't know. But we picked this particular hotel. I guess based on past attendance, they assumed that there were only going to be so many black students who would attend. I'm not sure the issue of the elevator ever came up.

But at any rate, we hired this hotel and all that. Then when the time came to buy the tickets, the ticket sales were such that there was just going to be a horde of us black people down there. And so this scared the teacher who was responsible for the prom to the extent that, “Well, the hotel wasn't going to hear of it. We're going to all get embarrassed.”

So to solve that problem, they cancelled the contract and spent the money to decorate the school gym. So I never had a prom in a prominent hotel. Both of my proms—those two, at any rate, were at the school gyms. [laughs]

Other than that, the classes I liked. I enjoyed Mr. Daugherty's course because that was good. The math courses. The one white person that I remember running to that ever really spoke encouragingly to me about going on in science, I mean, making a point to do that, was a math teacher who taught calculus, a German immigrant. She had a slight accent.

I wasn't discouraged by the physics teacher. I enjoyed that. That was a lot of fun. I remember his name, and I remember her name. She was Dr. Lange, L-a-n-g-e. He was Dr. Warner, W-a-r-n-e-r. I don't think I learned that much physics, but I just had a lot of fun doing it, and applying physics. And got good grades at it.

The only other thing that I recall that was unusual was on the same general campus, there was the Chicago Teachers College. At that time, in order to become a regular—we're talking about the late thirties now; we're still coming out of the Depression. And good, solid civil service jobs, white-collar jobs are not that easy to come by. If you taught in the Chicago school system, that was considered then a pretty good, middle-class job.

But because of the competition and so on, the way to become regular was to have come through the Teachers College, because that assured the principal that whatever you need to know, you would know, because they had their own idea of how good the standards were. Well, some of the people that I knew had gone to the Teachers College, or were going to the Teachers College and I looked at the curriculum that they studied. It seemed so devoid of any intellectual content that I decided I was never going to be an elementary school teacher. It was just too trivial.

Wilmot: Mmm! Strong words!

Bragg: Well, don't—take it out, then. Please!

Wilmot: Oh, no!

Bragg: What I meant was—and I'll stand by this, that the whole Teachers College preparation consisted mainly of methods, with very little content. I don't think that's changed to this day. The idea was that if you knew methods, you could teach anything. And I think that's probably why we have such a terrible problem today with people being turned off by science and engineering and the technical subjects, because the people teaching them very rarely know any of it.

And if you look at the prerequisites, they couldn't because they didn't study it! But, God, they studied lots and lots of methods. It turned me off of the idea, the notion of teaching, certainly at the elementary school level and probably at the high school level.

There was one incident, though, that—well, we can edit this out.

Wilmot: No.

Bragg: It's funny. The only time in my life that I ever cheated on an exam was not for my benefit but for some people that I knew who were trying to get into the Teachers College. That was the key to the promised land. While I was still working at the tea room and maybe I just finished high school or was right at that level—I was good at math—one of the young women at the library, maybe just a little bit older than I was, wanted to get into the Teachers College, and she said, "We've got this study group. We're studying for the Teachers College exams, and we're having a problem with the mathematics. We just can't do it. We need some coaching." They knew I did well at that. She knew it. So, "Would you help us?"

So I said, "Sure, I'll be glad to help you." "We'll pay you." And so it was about three or four of them. We would meet at her house. I'd go over these problems. But they were so far back that even the rudimentary algebra they just weren't doing well. And so somebody, coming up to the time of the exam, said, "Look, we're just not getting it. We've got to do something else." Said, "Why don't you take the exam for us?"

And just the idea of even asking that was just anathema to me! "What do you mean?" He said, "Well, the white people do it all the time." I said, "How do you do that?" He said, "Well, you go there and you take the exam, and you pass the exam to your friends" or whatever. God! This was just—I couldn't see myself doing that. But I'll admit to weakness. I finally agreed to do it.

Said, "Well, how are we going to going to get you in there?" "Well, we'll find somebody who signed up to do the exam—you have to have an admit—but decides not to take it. So you can be that person."

I'll never forget this. The first idea was, "I'll just help them with the mathematics," because that was the one they were really concerned about. We go to this high school. It's on the south side someplace, in a white neighborhood, but that's not important. But the card that I got, the person that I was impersonating was named Georgia A.P. Greene. I'll never forget that.

I said, "Wait a minute. This is a woman's name." They said, "No, no, don't worry about that. If they ask you if that's your name, tell them yeah. They think black people are crazy anyway. But nobody's going to even look at it." That's what they said.

Well, anyway, we did the math exam. I must have worked it about four or five times. It was so easy. Which told me again, "God! This is really minimal." So I did that so well, they said, "Well, help us with science." So I'm sure I did two, and maybe another one. But anyway, I think when I finished one of those times and went to turn in my paper, the guy looks at my card and looks at me and says, "Is your name Georgia?" So I looked him dead in the eye and said, "Yeah." He shook his head. [laughs]

To this day, I wonder how many people have been ruined by my helping somebody get into the Teachers College. [chuckles] It doesn't prove they actually got in. I never got paid, incidentally. They never did pay me. So the wages of sin is that you don't get paid! [laughs]

Some of those people were smart enough to have gone to the Teachers College, and they wound up going out teaching school. And they may have done no more damage than anybody else. I'm sure they were right. People do cheat on exams, and white people cheat on exams, too. But I have often wondered, do I really have a cross to bear for having cheated on one myself? I don't spend too many nights worrying about it. It's too late. But for a while, it did bother me. [chuckles]

I'm sorry. Go ahead.

Wilmot: I wanted to ask you about when you started going to community college, were you still working?

Bragg: I probably was working weekends with my uncle. Either that, or I was—oh, God, I forgot. Or I might have been working part time at the Palmer House.

Wilmot: The Palmer House?

Bragg: The Palmer House is a famous hotel in Chicago. It's right downtown on State Street or Madison, rather—Wabash, I guess it is. It was built by Potter Palmer. I don't know if it's still there. I'm sure the building is still there. But the Palmer House and the Sherman Hotel were the two main commercial hotels. They were not posh in the sense of being out in the suburbs, but they were the upscale commercial hotels where commercial travelers and conventions of doctors and people like that would come, famous entertainers. They had three or four or five different restaurants. It was just that big.

The waiters in all of these places were black at the Palmer House. Palmer House was so big, had so many employees, they even had baseball teams and so forth, (black guys who worked there from time to time, or regularly.) I had met one of the waiters who worked there when I worked at Mrs. Cagney's tea room. He would come there sometimes and eat. So I knew him, and that's probably how I got the job going downtown at the Palmer House.

Now, I never did become a waiter. That was too exalted. I was a busboy. And busboys simply pick up dishes. [chuckles] Well, you've seen busboys and waiters. As I say, I never did rise to the rank of waiter. But I worked there for probably a couple of years, part time. So I was probably doing that while I was at the community college.

And I guess that's it about the incident about the Teachers College and how I felt about that.

The politicization—being politicized and seeing what you can do with votes and all that, if you organize. The love, developing a real terrific feeling, for education just enjoyed that. And the encouragement from the math teacher about a serious career in science was the first from anyone.

Wilmot: And the physics teacher?

Bragg: He was always complimentary, but counseling me and suggesting that I go on, I don't think he ever did that.

Wilmot: That was your math teacher.

Bragg: It was the math teacher, Louise Lange, that was her name.

Wilmot: A German name.

Bragg: Probably German Jew.

Wilmot: I have a question for you.

Bragg: Yes?

Wilmot: What was your social life like at that time?

Bragg: It was a lot of fun. I didn't have a lot of money, but none of us had any money. But, you know, there were dances and the typical sporting events around the school, so I freely participated in all of that. As I said at the outset, that's when I discovered women, and I thoroughly enjoyed 'em.

Wilmot: Yes. Did you develop any close friendships at that time?

Bragg: My first really heavy crush, yes. I never did marry her. But I met her there. In fact, the first date I ever took her out on, I had to borrow some money from her. [laughs]

Wilmot: From her?

Bragg: Well, it turned out that we went to a dance. It wasn't a school dance, but it was a dance of young adults in a place on the south side, where we both lived. I had enough money for everything, but it turned out that the organizers of the dance were expecting to use recordings, records. But some goons showed up from the union and said, "No, you won't, either. You will have live music." Well, that meant we had to pay the musicians, so the price went up, so the money I had wasn't enough now. But luckily she had some cheat money or, you know, go-home money. So I borrowed some. Well, what was there to do? I borrowed some money from her. I paid her back, of course. [laughs]

Wilmot: What was her name?

Bragg: Her name was Coralie Stimpson.

[phone rings]

Anyway, I had other dates, of course, but she was the most important one. Other names, offhand I can probably dream up one or two, Mary du Cuir. But yes, that was when I discovered a social life, and I enjoyed it. I could dance pretty good, you know, and enjoyed going out.

At the end of the two years, we all shook our feet. Some went on to four-year colleges straightaway. Some, like myself, did not. Some eventually got through, and some never did, of course. In my case, I tried to work full time with my uncle, as a plumber's apprentice, and go to evening school. At that time, what is now Roosevelt University in Chicago was Central YMCA College. It had night courses, for people like ourselves, who wanted college training but had to work. So it was evening school.

My only thing I've got to say about that is I tried for a whole year registering for courses and not being able to keep up, working an eight-hour day. It turned out plumbing is a rather dirty business, and at the time we were actually living in what was best describable as a cold-water flat. So I'd have to come home, clean up, get on the elevated and get downtown and make classes. We didn't always quit at times when it was convenient to do that.

On top of that, I probably wasn't that determined. Not probably. I wasn't that determined, because otherwise I would have found a way to do it. But I wound up with a bunch of incompletes. Learned some things in doing it, but the programs that I tried were too much, and I didn't get it done. So a whole year went by, for which I had nothing to show except the experience of having tried it. Social life was going on, but the academic part was not producing anything. Then another year goes by. I would have to say I just drifted. I had one buddy, whose name was Edward Williams. His nickname was Dick. We were very close. We sort of were jugs you know, we just hung out together.

Wilmot: You said "we were jugs?"

Bragg: Jug buddies. It's a slang for—it means you drink from the same jug. That's slang you never heard, huh? Well, "jug" you wouldn't hear anyway, but "jug buddies," an older person would know "jug buddies."

But at any rate, we just sort of hung out together. And now we're coming up to 1941, Pearl Harbor.

Wilmot: Before we head in that direction, can I ask you a couple of questions?

Bragg: Sure.

Wilmot: First, when you and Dick Williams used to hang out, what kind of stuff did you get into?

Bragg: Oh, basically we would go to bars and pick up girls, sporting events when we could afford it. There was a small group that we sort of ran around together. We wouldn't pick them up, of course. We already knew them. But we'd have house parties, go out to the beach, things that people did. Well, that's about the size of it.

Wilmot: Was your social circle primarily African American?

Bragg: Yes, exclusively. We didn't make it a rule. That's just the way it was. [laughs]

Wilmot: I wanted to ask you a question about what did you imagine your life being like at that point? What did you imagine you might have or become? What were career tracks for you?

Bragg: I can't think of what I was thinking about because I would have to say I was not so fixated on getting through, going on with my career, that that was uppermost in my mind. Going to college was considered something you did, as I mentioned. My Aunt Edna, Uncle Teddy's wife, had been a schoolteacher. My grandmother had been a schoolteacher. I had uncles who were schoolteachers. So some vague notion that somehow I would I get to college was there. But the plan to do it was not there.

There's one guy I knew, who I respected and respect very highly for being single-minded about that. In two more years, at Central YMCA College he managed to finished with a four-year certificate. And I didn't. Now, I have other reasons not to have a very high opinion of him, but in terms of his determination, I would have to take off my hat to him. He washed dishes, he did whatever, he had, you know, ragged and tattered, but clean. [gestures to his clothing] But somehow he managed to keep going. He didn't do it in science. No pretensions about being scientific. I felt it was basically in bullshit subjects. But nevertheless, he did get a degree in two more years. I feel that if I had really dug in, I would have found a way to do it. I just wasn't that determined.

So I have World War II to thank for giving me a second chance.

Wilmot: So, after college, you didn't say, "Well, I'm going to become a such-and-such or thus-and-so?"

Bragg: No. The idea was that at the end of two years, I still have this vision of going on into engineering. Then comes a year of disappointments, trying to go to evening school. Now, why I didn't go on and continue nevertheless, I don't know, except I think it's a character defect because I could have done it. Other people did. There would have been a way. I believe that. If not in two years, I could have kept going. But I wasn't that determined.

And so—see, I'm lucky that World War II rescued me.

Wilmot: Tell me how that came upon you.

Bragg: Through the draft. [laughs] I was born in 1919, and so at age twenty-one—'41 is—I guess I'm almost twenty-two, right. Anyway, I'd been registered for the draft when I turned twenty-one, whenever that was. Now I'm working full time for my uncle. Dick and I are hanging out but not really going anywhere. And then the Japanese attacked Pearl Harbor. Now, I haven't been called up for active duty. I've registered, but whatever my draft number is, it hasn't been called.

But that hadn't happened then. The war effort wasn't really producing that much in the way of jobs. Dick and I at one time considered going to Pearl Harbor. Right after Pearl Harbor, there was a big demand for skilled artisans to rebuild the thing. I had done plumbing work and other employers, and we actually went through and applied for jobs, to go to Pearl Harbor to work. I got cold feet at the last minute and wouldn't go. He didn't, either. But we were both going to go to Pearl Harbor because the money was

going to be good. At that time, the defense plants and whatnot that eventually gave jobs to millions of people who hadn't had jobs up to that point had not really begun to integrate. There was a Presidential order that was precipitated by a threat of a march on Washington that essentially desegregated the job situation during World War II. Otherwise, we would have janitors all the time.

Well, about the same time, the Signal Corps, of the U.S. Army, at that time, the Signal Corps was a separate branch of the military. The Signal Corps, because of the needs for all kinds of communications—radios, radar and all that—found that they don't have equipment nor do they have the people who knew how to do this. In fact, most of the technical skills that have to do with manufacturing of whatever, or operation—there were very few people who could do these things. We were still almost back in not the agricultural age, but certainly the level of technical sophistication in our industries was not that high in a significant, in a significant proportion of the population.

So you needed a lot of everything, [people] who could do more than pick and shovel. And so what you do is you set up schools to teach people. And they set up these schools around the country in significant locations, where, for eight hours a day, five days a week, you went to school. So it was a very sped-up training program, in cycles, at levels of sophistication corresponding to a semester per cycle.

I went through almost nine months of very intensive—you can imagine, a forty-hour-week. That's pretty intensive. You've cut out all the other subjects that don't matter, that are not relevant. I'm not taking English and Spanish and philosophy or whatever; I'm just taking math and science and so on all the while, so I learned a helluva lot about electronics in that nine months, roughly nine months.

It had the benefit of getting me into the war effort, getting me into another view of what was technology and what one could do with science that was quite different from plumbing. And it paid a pretty good wage. It was a good civil service wage just to go to school.

By that time, of course, over time, as they were gearing up for the war effort, more and more people were either going off to the service or going into defense plants. What that did was to give me about nine months of training in electronics. Even a little code. You've seen people doing Morse code? You know, dah-dah, dah-DAH-dah-dah, dah-dah. [taps his fingers on the table to demonstrate]

Wilmot: Yes.

Bragg: I didn't learn that too well. But then somewhere along the line we were either compelled or decided to enlist in the reserves, which meant that whenever they cared to, they could call you up to active duty.

Wilmot: Were you compelled or did you decide?

Bragg: I don't think I felt threatened. I felt that that was a way to avoid active duty by staying in the reserves, I knew there was a chance I was going to be called up, but I can't say I was all that patriotic. I was willing to do my turn, but not rush to it. I think one almost got the impression that that was a condition of staying in these courses, and that was fine

because I was learning all this while. But then in April of '43, I was called up to active duty, which meant now you do go into the service, and that started my military career.

Wilmot: Before we talk about that, can I backtrack for a minute and ask you about Pearl Harbor? Do you remember the day that that occurred?

Bragg: December seventh. I don't remember what day of the week it was, but I think it had to have been a Sunday, because they were off duty in Hawaii when that happened—by now, everybody knows the story. But nobody was on duty, pretty much. People weren't around the base. So it had to have been a Sunday. And everybody knows it was December seventh, of course.

Wilmot: Do you remember the reaction, or do you remember the moment of hearing about it?

Bragg: I don't, because it seems to me I didn't learn about it until the next day, because I was at work, I think, when I became aware of what just had happened. That scared the hell out of everybody, of course. Up to that point, we're not terribly aware of any vulnerability of our country. Understand that by '41, Hitler has overrun, the German army has overrun Europe, much of it. They defeated the French at Dunkirk in 1940, around May. They more or less consolidated their position. They occupied Europe, pretty much. Not Russia. And not Spain. That was neutral.

So we were aware of Hitler's success—what had happened. In all that time, of course, what was going on, the country was sending arms and food and stuff to Europe and Russia. A lot of guys had gone into the Merchant Marine to make money. Convoys of things were being sunk and all that. But nobody was attacking us. Now here comes this Pearl Harbor thing in 1941, and that scared the bejesus out of everybody because now people are—I don't remember being that hysterical about it—but certainly the whole attitude changed, that now we're capable of being attacked by Japanese as well as the Germans. I don't remember a big wave of enlistments going on. Everybody was already requested for the draft, it might have happened, but we were already mobilizing before Pearl Harbor. It was just that the pace now stepped up once that happened.

Wilmot: Were any other members of your family involved with the military?

Bragg: My brother went. He went to the U.S. Navy. The time frame is sort of coincident in that he had come to—he's four years younger than I am. He had just finished high school in Memphis. He'd remained there, living with my grandmother. But he'd come to Chicago to—I guess by now the war effort is coming on, and—to get into whatever's going on, jobs. The opportunities are going to be greater in Chicago than they are in Memphis.

He tried enlisting in the air force. He wanted to fly. I told you my uncle had an airplane. I don't know what happened there, but for some reason—well, the main reason was they were only going to train a very few black guys to fly [at Moton Field, Tuskegee, Alabama; those who participated became known as the Tuskegee Airmen, whether they were pilots, bombardiers, navigators, ground support mechanics, et cetera] That story is, of course, very well, known by now. Well, well known to us.

But there were enormous numbers of guys who could have learned to fly, who never got a chance to learn to fly because the policy of the air force was not to have any until the

breakthrough came with setting up the Tuskegee experiment and the 99th Pursuit Squadron [one of four African American squadrons, the others being the 100th, the 301st and the 302nd which comprised the 332nd Fighter Group]. But only a few guys out of the thousands that could have done that ever got a chance to do that, so I'm sure they found some pretext to disqualify them.

He wound up in the navy. That was in the immediate family. My brother and I both went. I'm sure I have a couple of cousins, my father's brother's sons, who went. Three of them, actually. But I didn't have any contact with them during the military. We never crossed paths.

Wilmot: Was your brother on active duty?

Bragg: Yes. But before then, he got a job in a defense plant in New Haven, where Yale University is, New Haven, Connecticut. He worked actually making guns—you know, Winchester, machine shop, making guns. He was brought into active duty from there. By that time, he's old enough to go in, and he has to register. In due time, he went in. He spent about nine months in technical schools and wound up as machinist mate. He spent the whole rest of the war in an oiler, which is a ship that carries oil to other ships. But anyway, my immediate brother did serve, yes.

Wilmot: And then for you?

Bragg: Well, for me, it was quite an experience because having been enlisted, I think my enlistment already carried a private first class rank.

Wilmot: Because?

Bragg: I'm not sure why, but I was already a PFC when I went in. That didn't make any difference to the army at that point. But the way the thing operated, you went to a reception center, which was some fairly large military post, where you went through physical tests, placement tests of all sorts, and outfitted, et cetera, and then you were sent off to some location for something to happen to you.

In my case, it was Fort Custer, Battle Creek, Michigan, which was probably named after [General George Armstrong] Custer. You went through tests there, physical, of course, and classification tests, which were supposed to determine what you're capable of doing, or what you can do now and also your potential. It's sort of like taking intelligence tests and aptitude tests.

One of them was the AGCT, Army General Classification Test, which was the equivalent of an intelligence test. And the numbers went pretty much like that: 100 would be about average, and up around 130 or so, that's considered to be really smart. If you're down around 75 or so, not so smart. I scored fairly high on that. (137)

And also I think when it came to the test—they had the aptitude test for doing code, doing signals, I deliberately did the worst I could have done on that because I didn't want to wind up doing that.

Wilmot: Why not?

Bragg: Well, it seemed to me that was a pretty uninspiring way to spend the war effort, doing code. [chuckles and taps table with his fingers]

Wilmot: Tapping away.

Bragg: And sending messages. I could have passed—not that it would have mattered, because in the end, I got sent off not to signal corps but to air corps for basic training. And that was Kearns, Utah, which is a little town outside of Salt Lake City. At that time, Salt Lake City was just a big desert camp that was built up there to train soldiers, but now a bedroom upscale suburb of Salt Lake City. I went for basic training there, which lasted, I think, eleven or twelve months. No, no, no, no, not that. No, three months, only about three months.

The interesting thing about that was first we're in Utah. I'd never been west before. The climate there is dry, cold at night, hot in the day. Never had any respiratory problems, which was a revelation to me, (that part of my respiratory problem had to do with the humidity). I was put into a unit which had other guys like myself who had been in these civilian [pilot] training programs. They were mostly partially college educated or fairly articulate, but some of them were practically illiterate. So in each company would be the whole gamut of backgrounds. But mostly rather low-scoring people, farm boys and blue-collar workers.

This particular one was segregated. I think the training squadron that we were in had about thirteen or fourteen hundred men in it at any given time, so we'd be at different stages of our training, of course. You came in by platoons, which would be about fifty men to a barracks.

I remember when we arrived there, the camp was still fairly new, because of the chow lines. Chow is food. This mess hall (where you eat) would serve essentially fifteen hundred people per meal. They had it so poorly organized that you would be in long lines of people waiting to go in and get your food. In the meantime, the food wasn't all that good. In fact, it wasn't good at all.

There were things like powdered eggs which, by the time you put them in the steam table, it's like rubber. Spam. It wasn't good food. And I got to the point where I would just go and get some coffee or something and some bread and wouldn't stand in that damn line to get that food.

On top of that, because we're out in the desert, there's a lot of sand in the air, and the gear you have to eat out of is called your mess kit. It's a metal contrivance that closes up, but if you open it up, it's divided in sections. It's like two halves of an oblong plate, and you have a cup with a handle on it that opens out, and you have a flask for carrying water. All that's gear that you carry on you.

But you didn't have plates at the mess hall. You took your mess kit at that particular place. Well, you can imagine getting sand in your eggs or whatever. It's hardly a way to enjoy your meal, so I didn't find that terribly exciting or terribly gratifying.

But as it turned out, Dick, my old buddy, we had thought to go to Pearl Harbor—had in the meantime wound up in the military before me, and he had finished his training and

had gone through a technical school, as a lab technician. He was working at the station hospital as a lab technician, which meant that he would do lab analyses. They would analyze blood, urine or feces, the stuff that now you go for your lab work. But he also did analysis of tissues.

Anyway, he learned enough of that to wind up as a corporal in the station medical lab, and on top of that, he was the ranking black soldier in the lab. They had a lot of black orderlies. These were guys who just carried bedpans and cleaned up the hospital wards. So he wound up in charge of the black contingent, just because he outranked all the others. You can imagine. That's the highest rank at that time, just two grades above private. But at any rate, he was in charge of that detachment.

Well, I don't know how he discovered that I was there, but he said, "Look, I know how you're suffering down there." The station hospital was sort of on a hill, like. Not a very steep one, but when I say up, literally it was slightly higher ground than the rest of the camp. And that's where the hospital was. We were down there in the flights, he called it. "Flight" meant—instead of platoons, in the army they called them flights, about fifty men.

He said, "Look, why don't you do this? Why don't you come up here and have dinner with me, because the food is much better." I said, "How am I going to do this?" He said, "Well, when retreat comes, instead of going to your own barracks, just come on up here and mingle with the patients. They won't know the difference. We can have great fun."

So that's what I did for the rest of my basic training. I stopped standing retreat. Retreat is a formation. It's the end of a soldier's day. You worked all day, whatever it is, but at quitting time, on an ordinary job when you're in a garrison situation. You form up in ranks. Whatever is important to say about the day or tomorrow is said then at that formation, and then you're dismissed as a group.

The other one, of course, is reveille, when you first get up. That's another formation you stand.

But at any rate, nobody paid much attention to who was in the retreat formation, unless it was special. Now, of course, you better not be caught not there. But often I wouldn't even go. When we finally would finish our duty, whichever the fatigue was—fatigue means work—you would go back to the barracks and kind of cool off before you stood retreat.

Well, I wouldn't go out to retreat. I'd just go on up to the hospital. Now, it turned out that he had the keys to the station hospital laboratory itself, the medical lab. At that time, they didn't keep records on the alcohol. They used absolute alcohol for a lot of purposes around the laboratory. And in hospitals, you have a lot of fruit juice. For the patients. And it was cool. The place was air conditioned because of all those chemicals there. It was well lighted. So I'd go up there and after dinner we'd sit around and we would write letters home and everything, in an air-conditioned setting. He would go out on the ward and get a pitcher of orange juice or something, and we'd make ourselves these highballs with this absolute alcohol, and have a great old time! [laughs]

So that took a lot of the sting off of the basic training. I did all the stuff you had to do, but all the other indignities and privations and all that, I didn't go through that. Even KP duty. KP is called kitchen police. What that is, is with a big mess hall that's serving 1,500 people, the staff to do that has to be large. And so typically, the scut work that goes with that was divided among the soldiers. Once every so often, your whole barracks would go on KP. Now, they don't trust you to cook the food, but put you peeling potatoes and washing dishes and all that kind of stuff and serving on the chow line. That was what you did when you went on KP. And you did that for a whole day. It wasn't that often, but it was an onerous duty. You didn't like it.

So he dreamed up the notion of do it this way: When I would go on KP, I'd tell him, "My flight's on KP tomorrow." He would call down to the captain, (the head of the mess hall), and say, "Send Private Bragg up here for his syphilis test" or something like that. That is, he wants me to get the hell outta there! [laughs] So I'd go on up to the hospital, goof off the rest of the day. [laughs] So KP turned out to be a nice day for me. [laughs] After the first day I did KP, I never did KP again. [laughs]

Wilmot: You were lucky.

Bragg: Yes, I was lucky.

Wilmot: You were lucky that Dick Williams was there.

Bragg: Oh, yes. No question about it. I would have been right in there with the rest of them otherwise. [laughs]

Wilmot: Yes.

Bragg: No, Dick, he was like my big brother. He was a little bit older than me and more experienced, with everything. Actually, Dick wasn't at all that well educated. He had about a high school education. But really street smart. And, of course, he had lived a little longer, and he's a little tougher all around. He not only was the guy who could run that detachment, he could just about lick every one of them, too. Not that that was a prerequisite.

Wilmot: Where was he from, again?

Bragg: I knew him from Chicago, but he had been born in Georgia. But he, like many, had come to Chicago. He had relatives in Chicago.

But there was nothing particularly eventful about Kearns except two things: classification. When we were getting ready to get into our training program—we already had our AGCT tests, but now, once they've got you basic trained, they have to send you off to some kind of school. And the reason for that is that you want a basic soldier who at least knows the basics, but almost everybody has some kind of a job other than just shooting a rifle. That could have happened, too, but not everybody—very few actually went into the infantry. Maybe only about 10 percent of the whole army was guys out there with guns. So you went to be classified and sent off to some kind of technical school. When you think about the demands for warfare, you need all kinds of professions and trades. [sound of microwave oven being programmed and heating]

Even shoemakers, opticians, making glasses in the field. You need signals, you need ordnance [microwave oven announces completion of heating], people to fix trucks, butchers and bakers. [microwave oven opens] You can just go around the civilian list, and with very few exceptions [microwave oven closes] you need the same skills you would need in the army.

So they had all these technical schools, some very mundane and some rather sophisticated. And so when you went down there, you went through tests that established your minimum abilities. And then you are in principle given a choice, at least to attempt to choose a tech school that you would like to attend.

Or you could also try to go for officer candidate school—become an officer. Well, looking at all of the choices that were available, the one that looked the most interesting to me was cryptography.

Wilmot: Cryptography. What does that mean?

Bragg: Decoding secret messages, or encoding secret messages. Well, it involves mathematics, of course. That looked interesting to me, and I thought that might be fun. I had read some spy stories. There's one in [raps table as he tries to remember] Robert E. Lewis—let's see, the one—*Treasure Island* [Robert Louis Stevenson]. Even as far back as that. There's a code involved in some kind of secret stuff. I mean, that looked interesting to me.

Interestingly enough, now, the score requirements for that were much higher than were necessary to become an officer. In other words, you could have been a private in cryptography school and remained there. But you needed I think it was, like, 120 on the AGCT test to do that. But you only needed about 110 to become an officer. So it tells you something about the dimness in intellectual qualities that are involved. It's not just how smart you are, but other things that are involved.

But also you could apply to go off to Army Specialized Training Program—go off to college, in uniform. And so I also applied for that, to go into engineering, which I had been after as a civilian. Of course, I think I picked signals also, but I picked cryptography first. Well, I never got either one of them.

Well, when my training ended, I was put on a shipment to go to Seymour Johnson Field in Goldsboro, North Carolina. It wasn't a very large detachment, such that when we were put on a rail car, we were all contained in one car. There was a white soldier—he was either a corporal or a sergeant—in charge of the detachment. We were all black but him.

The way things were then, as the railroad train schedules permitted, we would be hauled so far on one route and dropped off, and then another train would come through and hook us up. So we got out there by stages, we didn't just go straight through.

And the reason for mentioning that is Osawatomie, Kansas. Now, we were put off there. We didn't know how long, but we were just waiting till somebody came and hooked us up again. So the corporal let us scout around—"Just check back in periodically, to make sure we don't lose anybody, and go out and see what you can find."

Well, Osawatomie, Kansas, was the birthplace of John Brown, the abolitionist. A big statue of him right there at the train station. But we were Jim Crowed. When the time came to eat—naturally soldiers are looking for women and liquor. This is Kansas, now. It's kind of rural Kansas, and it's almost like being down South at that time.

One of the guys was looking around and wanted to find out where are the women? Where's the liquor? So he sees a barbershop there, and there's a black guy in there, shining shoes. And he goes in and wants to talk to this "brother." And the guy almost trembles. He comes outside and he more or less says, "You don't do that. You don't go in that barbershop. It's white."

Well, anyway, the important part of it is—I mean, some of them eventually found some liquor somewhere, but when the time came to eat lunch, we still hadn't been picked up, so it was time to eat. And we don't have any food, so his, the escort's responsibility is to feed us. He's representing the army.

There's one restaurant in town, and so he took us down to this restaurant. Goes in. First of all, they don't want to seat us. I'm not sure how the detail went down, but the essence of the story is that they refused to feed us. Well, I forget the exact language that was used, but the upshot of it was, Well, if you don't, we're going to tear this place up. This is a cracker from the South, now!

He could have found some way to go along with the traditional, with the local mores, but he didn't. He said, "No, you're going to feed these men. They're in the United States Army." I can remember there were black people outside, looking in the window. They had never seen a black person sit in there and eat or do anything as a guest. And so that was another educational experience. In Osawatomie, Kansas, the birthplace of John Brown.

Wilmot: Did you find while you were in the military that in some ways being a military person somehow circumvented America's race discrimination?

Bragg: The circumvention would be rare. More often, it would be accentuation [laughs], if anything. For example, back at Kearns, I think the movie hall was segregated. I don't think we were excluded, but I think it was segregated. In fact, I remember a bunch of guys coming through there one time. Had been out on maneuvers, and they had guns and everything, ready to go overseas. And something happened that they objected to, and the police rounded them up. Had guards. They had brought in some troops from somewhere. And this whole camp was just surrounded by trucks with guns and everything to shoot these black guys. The next day, they were all gone. I forget what the protest was about, but some kind of discriminatory practice. They—"Well, hell, we might as well die here as die there."

So that was the more common thing. Circumventing, getting around military discriminatory practices, that would be rare. Later, when I went overseas, some of these things—local option. I'll skip to this, since we're on it. I finally wound up, after all this is said and done, I wound up going overseas in charge of a small detachment, a quartermaster laundry detachment.

So we go from signal corps and electronics to washing clothes. That was the army. And in the Philippines, we were attached to a field hospital. A field hospital is short of being, close to an evac[uation] hospital, like M*A*S*H, would be the next echelon back. Not that far from the battle front, but essentially secure. Maybe a couple of hundred beds, something like that. And, of course, they have lots of linen. They have operating rooms and stuff like that.

So they need somebody, something to wash the clothes, the linens they have. That's what the quartermaster—so they don't travel with their own unit; the army attaches independent special units to them for that purpose, depending upon what their needs were. For example, if there was a big battle, they would bring in a surgical combat team. This is a bunch of surgeons who just go from one big battle to another. When the battle is over and they don't need them anymore, they go somewhere else or go rest.

So these field hospitals would have a number of units that are not integral with them but have their own unit designation. But they're only temporary. But when we joined them, we were the only black people with the hospital, and when we arrived there, things were kind of hectic, so nobody's worried about anything except getting the job done. But when things began to cool down, they set up a shower for the men to bathe. Basically just a great big water tank overhead. There's a canvas shroud around the shower so people couldn't look in there and see you naked. And some wood floor so you wouldn't be standing on the ground. But you just go in and pull a string and the water would come down and you'd take a shower.

And that was fine. We all went there and took showers. And then one day we show up, and there was a second alcove, a partition there, with our unit's number above it. That says: You niggers take your shower here. That's what it meant. Before I even saw it, one of the men had gone there to take a shower and saw this, and he was writing a letter home. I had to censor the mail, you see, as part of my responsibility as the person in charge of my unit. Even at that level. He was saying, "They're even Jim Crowing the shower." And when I saw that, I sent the letter on up, of course, but then the white officer who censored over me [laughs], part of the medical detachment, comes down and says, "Look, we can't have this kind of stuff going home. It will upset people." I said, "Look, it upsets me. This is awful."

One of the few courageous things I think I ever did was to challenge that by going directly to the colonel in charge of the hospital. Understand, at this time I'm a technical sergeant. I'm not even an officer yet. But at least I'm the highest-ranking thing in my detachment. At any rate, I asked for permission to see the colonel. I went to see him about discrimination in the shower.

Meanwhile, I asked to see a copy of the army regulations that had to do with the inspector general's office, whose job it is to go around and ferret out, well, sources of bad management one way or the other. So in due time, I had my audience with the colonel. His name was Gench.

Wilmot: How would you spell that?

Bragg: His last name was Gench, G-e-n-c-h, from some little town in Missouri. And so when he asked me what I was there about, I told him and what I thought about it. I told him

that we were supposed to be there fighting for democracy, and this is a strange way to put it. First of all, there wasn't any problem. If there had been some kind of an outbreak or a big scuffle, that would be different. Maybe. But there wasn't any problem, why put that up there? Why introduce it?

He said, "Well, you know, we have a lot of Southerners" and stuff like that. "Besides, my first duty is for the health and welfare of my troops," and that means that he has to make local decisions that may not be correct or whatever, but he has to be the guy that has to get the maximum performance out of his unit, so in other words, if discrimination and segregation is what's needed right now, that's his prerogative to do it. He might be called on it, but he could do it.

So he didn't give me any response, and I saluted him and went out. I fully expected I would be busted and gone to Siberia. [laughs]

The sign came down.

Wilmot: The sign actually said?

Bragg: Said the "235th Quartermaster Laundry Detachment." It didn't say niggers, but everybody knew what that was. That was us. But I'm saying that the sign came down, and we never had another moment's issue of that kind. So there again, here was a Southerner—. With that hospital, now—other places, it doesn't mean that nirvana had come, but as far as Col. Gench was concerned, that sort of thing didn't go.

I later discovered—and this is the irony of the situation—that the guy who had put the sign up there, who had been responsible for putting it up there in the first place, was a white guy from Massachusetts. He thought he's going to keep down trouble by segregating us. Totally unnecessary! So all kinds of lessons you learn going through things like the military. The very guy I would expect to say, "Well, look, you know, most of our people here are not used to taking showers with black people" or Negroes or nigras or whatever they called them, did not. As far as he was concerned, he didn't say what his rationale was, but the sign came down, and the issue never came up again.

Not only that, some time later—and we're jumping way ahead of the story, actually—but some time later, an organizational change came down from 6th Army Headquarters. By virtue of the experience we had had in combat situations, it turned out that we were overstaffed. We had more people than we really needed for that size of unit. And so it meant that we had a lot of people who just didn't have that much work to do. Well, in that case, what you do is send them someplace else where there's a manpower shortage. So that meant two things. One is you have to get rid of people or, rather, transfer them out, as requested. And also the second thing was that the table of organization called for the job that I was doing as a sergeant being done by a new second lieutenant. The only difference was one is an officer and the other is not.

Well, to handle the first issue, the order came down to transfer so many men of this rank to a certain unit over there somewhere. This unit was worse than us. They were digging ditches. We were washing clothes. And the other issue, as far as the officer was concerned was taken up by an officer within the headquarters of the 6th Army. A

quartermaster general, and he has responsibility for all quartermaster functions within that 6th Army.

This particular guy, who had responsibility for these units all over the Philippines, units like this, knew me. I had a well running outfit. He came down and said, "Bragg, they're going to change this organization, and it calls for an officer. Can you do that job?" I said, "Sure." He said, "Why don't you apply for it? Direct commission. And we'll see what we can do. You might as well have it," he said. "You're doing the job anyway."

So he said, "I'll send the paperwork, and I'll talk to Col. Gench." He didn't say he'd talk to Col. Gench. But anyway, the point is that paperwork—I fill out the form, they appoint a board at the hospital. The orders require that they have to appoint a board to examine me and recommend whether or not I should be promoted directly, without going through any training to be an officer.

It was an interesting experience because I had been popping off about discrimination and democracy and all that to the colonel. Now he has to appoint this board which has the power to say, "No. No way is this guy going to be an officer!" [chuckles] And on top of that, one of the officers, I think the guy who was the chairman of this three-man board, was a major from Atlanta, who was known to be a real cracker. Cracker means a very disreputable white person.

You understand the word "cracker?"

Wilmot: I do.

Bragg: Okay. [laughs heartily for a long time, as does another man in the room] Test your hipness!

Anyway, this guy was known to be a real bastard. And so I'm expecting they're going to give me the shaft, because all they have to do is to ask me a few questions that I would have had in officers training school that I hadn't had. I'd be outta there! It was a farce! Of course, they were medical people anyway. They weren't really military, themselves. But they must have had some form there, and I can remember getting questions:

"Let's see, now, Sgt. Bragg, you know So-and-so, don't you?" I said, "Yes, I do." Didn't ask me to tell them what it was, but "You know that, don't you?" "Well, do you know So-and-so?" About three or four questions like that. "Anybody want to ask any more questions?" "No." Saluted him. [claps hands] Out I went.

A few weeks later comes an order from [Gen. Douglas] MacArthur saying, "Swear this man in as second lieutenant." That's how I became a second lieutenant. [laughs]

Wilmot: Wow.

Bragg: Well, there are two things. One is I had a reputation of running a good outfit. You know, it functioned well, and I got lots of compliments on how well it ran. I was straight. And I hadn't done anything that was outrageous. Just did my job. Somewhere along the line, that must have been respected because this guy, who I fully expected, just because he

was from Georgia and a cracker, would find reason not to be at all helpful. But if anything, he had gone out of his way not to put any impediments in my way.

So it taught me a lot about prejudging character, prejudging people. Smiles don't mean friends, and scowls don't mean enemies.

Wilmot: That's for sure.

Bragg: I jumped way ahead, but that was the spin-off from having gone through—well, let's see, we were back at classification and picking schools to go to. I picked cryptography, which I never got, and signals, which I never got, and they sent me off to a labor gang. An aviation squadron is another euphemism for a labor gang. You need people, laborers around any kind of place, people who do the scut work. That was what this squadron was doing in North Carolina.

Went through Osawatomie, Kansas, and finally arrived at Seymour Johnson Field in North Carolina in my first active duty assignment as a private first class in an aviation squadron. It was kind of a bummer. I couldn't see any connection whatsoever between radio, radar and pick and shovel in North Carolina, out in the boonies.

I wound up in a squad, just like everybody else. Many of the guys who had come out with me had gone through similar kinds of electronics training, so it wasn't as if they were all laborers. In hindsight, what the army was trying to do was to inject into this unit, which had been formed from some old regular army people, who weren't terribly well educated, some better educated men in there to raise the level of sophistication of the squadron.

So we were all destined to go higher. I knew that later. But at the moment, we came as privates.

Go ahead, you had a question.

Wilmot: As a strategy, did you feel like that was successful?

Bragg: Oh, yes. I didn't stick around to see it, and I didn't recognize it then, but later, just looking in—if I were faced with the same problem, it was the thing to do when we arrived there, the first sergeant was an old—he had probably been a corporal or something. In the regular army, it was so bad, coming up to World War II, very few blacks had achieved any kind of rank, and the army did so little that they were basically Stone Age. They were way behind the times.

But since they were already regular army, they became the cadre. They were usually promoted a rank or two, and then these recruits are brought in to them to be trained. This particular one was not at all well blessed with high-quality noncommissioned officer leadership. We with our high tests scores and all that, our education, were bound to rise.

By the time I left there, one of them had become the first sergeant. He'd come in as a private, like I did. So it was a strategy that made sense, even though it was a segregated situation. Within that confinement, it made sense.

What I wound up with was in a squad, nice guy in charge, but doing whatever everybody else was doing. I remember going out in the woods, chopping down trees. And then I noticed that there was one guy there who ran telephone lines. Right away I said, well, I'm with signal corps. I should be doing electronics.

So I went to see the officer who he reported to. I said, "Look, I'd like to go work with him." He said, "Well, Bragg, I've seen your test sheet. We've got another idea in mind for you." So I had already been singled out for something. He said, "You go to work in the supply room for Sgt. Waters."

So I wound up in the supply room, which is essentially everything, every material thing, including ink, pencil, paper, not food so much but everything except the food, it's issued through there, and all sorts of equipment. If it's quartermaster equipment, you're responsible for that. It means record keeping, it means being able to go to a store and make out a requisition, and stuff like that. Paperwork.

But if you're not terribly literate, even that's a problem. So for that, they didn't need anybody with my background to be able to do that, but from the crop they had there, I was quite capable of becoming that guy's boss. The officer's job, for that matter.

But anyway, that's where I wound up, in the supply room. And so I didn't chop down trees very long.

Wilmot: It sounds like chopping trees is a real departure from the way that you describe yourself as being very sickly.

Bragg: Well, I didn't say I did it very well. [laughs] By that time, I'm not all that sickly. I mean, nobody would have put me up, you know, as the macho man of the army, but by that time, I looked pretty much like all the others.

Wilmot: Okay.

Bragg: We were all—not great physical specimens. World War II found us not the most fit. The Germans were much more fit than we were. Oh, yes. Strong emphasis on fitness.

Wilmot: Hmm.

Bragg: Anyway, I wasn't the greatest tree-chopper-down. In fact, I remember one day going out there. We were city boys and country boys, and we were making this cord wood, cordwood road. Basically we're out in the woods. The field was not in the woods, but we went out on a bivouac, and we had to go some miles into a forest. Pine trees. The road was a muddy road. What we were doing was to make it a little bit less muddy by cutting down some trees and just laying them down like logs, and we would drive over that.

Well, the country boys know the woods, and they know which wood is hardwood and which wood is not. But the city guys don't know one from the other. So whatever this tree was, it was the hardest damn wood that you could imagine. I'm whacking away at this thing, and nothing is happening. There's this guy, and he's just falling out on the ground at this greenhorn trying to chop down this tree.

So I got kind of angry with that guy. Why didn't he just tell me?

Wilmot: Was it hard to be away from Chicago and hard to be away from everybody you knew?

Bragg: Yes, but not particularly. At that time, that's the way it was. Sure, you missed home. You missed everything. You missed the freedom you had at home. There's no freedom there. You very often had bad food. You didn't like the clothes you were wearing. You didn't like the restrictions. So, sure, I was just as pissed off at the army as anybody else was. I didn't feel I had found home there.

But you make an adjustment. Everybody's doing it. Everybody complains, but nobody is excepted—he's so much better than anybody else that he shouldn't be there. Mostly that was true. Not always.

Wilmot: Did you make any good friends among your army folks?

Bragg: While there, yes, but let's put it this way: They were guys that you hung out with. In basic, of course, was Dick Williams, my buddy from Chicago.

Wilmot: Your mug?

Bragg: Yes. Jug. Not mug, jug.

Wilmot: [laughs]

Bragg: At Seymour Johnson Field, once I went to the supply room, my job took me away from the everyday drill. I was, like, in an office. Quick as I could, I would get downtown to the service club, where the girls were. So I don't remember the names of anybody there, frankly. Except for one guy, Lucius Leeper. I remember him because he went off to ASTP [Army Specialized Training Program] before I did, even though he arrived after I did. And that was the only rather significant thing that, major thing I guess that happened there.

I had applied to go off to college, to go to school. He had come in. A very likeable guy. Very soon, he was gone to ASTP. I said, "Wait a minute. He came in after I did, and I'm still here. How is that?" Somehow I found out that the probability was that I had been called before but not allowed to go.

So I went down to Classification (a unit in Headquarters), where this was done, and asked, "Is that true?" They said, "Yes, you were called up quite a while ago, but your commanding officer wouldn't let you go." How that hurt me! "You mean I've been around here and could have been off at college?" He said, "Yes." "Can he do that?" "Yes."

As long as it did not materially affect the efficiency of his organization, he's supposed to let you go. But if it's going to make him look bad or degrade his unit's performance, he's not required to let you go. So he could do it, of course.

So then I confronted the supply officer, the guy who was the boss of the supply room. I said, "Is that true?" He said, "Yes, it's true." I said, "Why'd you do that?" He said, "Well,

we thought you'd be happy here. We're going to promote you over Sgt. Waters." I said, "Yes, but I don't want to be in the supply room. I want to go to college!"

He's an officer, and I'm a private right now, but he finally said, "Well, look, the records we've got are in a mess." I hadn't been there very long. Sgt. Waters, for all his nice guy wasn't much of a paperwork man. "If you'll get all of our records brought up [to date], the next time you're called up, we'll let you go."

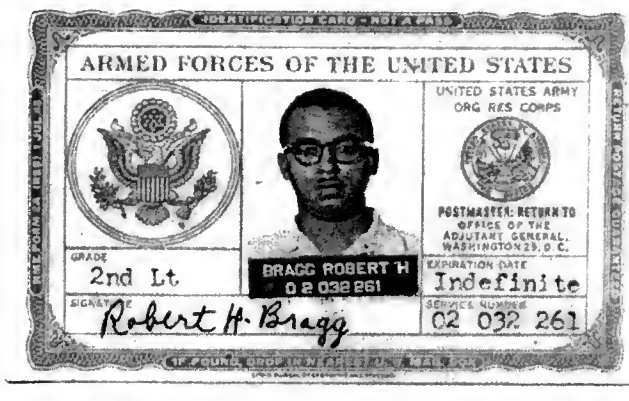
So I did, and he did. So I just dug in and worked night and day and got all the records and everything shipshape in terms of men's records, property records, all that kind of stuff. I had to learn a lot about accounting, military accounting and stuff like that. It was quite a learning exercise, actually. But I didn't really like it that much [chuckles], so when the time come to go, I went off.

It was coming up to Christmastime. I was sent to Greensboro, North Carolina, because that's where they had another classification post, right on the campus of what's now North Carolina A&T [State] University. It's a state school.

Wilmot: I think we should close for today.

Bragg: Good. My God, yes! Because my cleaning lady is due here.

Wilmot: Okay.



Interview 4: July 1, 2002

[**starts disc 4, track 15]

Bragg: Okay. Well, I guess we've finished the classification at the star unit, ASTP unit in Greensboro, at North Carolina A&T College, and shipped off to Rhode Island State College in Kingston, Rhode Island. This trip is going to take me through New York City, and on to Long Island. There's a railroad that goes from New Haven to Boston, or New York, New Haven, Boston, whatever. Get to Rhode Island state, am immediately given a pass; I can go down to New Haven where my brother lives and visit several days, because the class hadn't, the new semester hadn't started yet, the winter semester.

Wilmot: Can you tell me again what your brother did while he was in New Haven?

Bragg: My brother was a machinist, and he worked at the Winchester plant making guns. [chuckles] He basically became a machinist mate in the navy, but at that time he was a civilian living in New Haven. It was nice going there and visiting him. He had met an Italian family who had a pizza parlor. Believe it or not, I might have seen the word pizza, but at that time I had never—I had no idea what it was. But they closed up the place one time and brought out big jugs of wine and everything and just made pizza. We had a great old time eating pizzas made just for our party there.

Anyway, the experience at Kingston, Rhode Island, was that I was assigned to a special unit because of the fact that I was much further advanced in terms of college than the typical soldier who had come there in uniform. I already had two years of college, plus a little bit, that nine months roughly of civilian education in electronics. So I was much further ahead than the typical soldier. There were a few of us like that, except that the others were white. So I had a small—this unit might have had fifteen or twenty, I'm trying to remember, men, all white except myself, and it was electrical engineering. So most of them were juniors rather than freshmen or sophomores.

There are about 600 of us soldiers in the men's dormitory, a huge, old style campus, with a quadrangle, of that early period of American university college history. It sat on one section of the quad. At extreme ends of the dorm were myself and a black guy. My roommate was Critchlow. Or was it Rich? I can't remember. Anyway, but there were two of us on one end [laughs] and two of us on the other end. This is 600 guys, four of them are black, and let's see, the probability of getting one black guy out of the first selection would be four divided by 600. That's one part in 150, about, so that's less than 1 percent. So the probability of two guys—it's like astronomically small—of being accidentally, luck of the draw put in those two. Especially since we're in the same class. But there we were, I had a black roommate, and the other guy had a black roommate. One of them was a guy I mentioned, Winston Critchlow, who I remember because he was from, his parents were from Barbados. I think he actually, he talked like Manhattan, but I got the impression that they were in Albany for some reason, I don't know why that is.

Another guy was named Rich. Critch was rather African-looking, had rather Negroid features. But Rich was this kind of a bourgeois, mulatto black from Washington, D.C.; he was an architect aspirant. The other guy, the fourth one was a guy who eventually became the head of the National Urban League, was named—

Wilmot: Whitney?

Bragg: Whitney Young, of course. Whitney Young at that time had already graduated from college. He had been a campus brat in Kentucky. He was a good basketball player, and a tremendous guy with the women. We would walk into a party or something, and before we could get their names, he had already cut out one from the herd. He was just, he had that magnetic personality. And men liked him too.

Whit was there, had already been in one ASTP program at MIT, but now he has come there to get into pre-med. He never did get into medical school. He eventually wound up in the 92nd Infantry Division, Whit did. But more than that, when the Civil Rights Movement comes along years later, he along with Roy Wilkins, I guess, who was the guy with SNCC, they were the four big powers in the Civil Rights Movement.

So Whit was a very likeable guy, not too driven, kind of laid back actually. But anyway, he was the guy that had all the contacts. When we would go to Providence, he knew where to go. He had been in Boston for a while, so he had kind of scoped the area. Plus his fraternal contacts, social fraternity—I think he was either a Kappa or Alpha Psi, or Alpha Phi Alpha—would give him local contacts, and right away he was part of the black bourgeoisie. So that way, we managed to meet chicks very well, very easily, with his help. So he was very useful to us, and we were useful to him.

Wilmot: It was interesting to me when we were talking about this previously, how you were describing how you would meet people socially, and how women at that time were very concerned about their reputations, at the same time that many of the men who they would ordinarily kind of be hooking up with—

Bragg: Gone!

Wilmot: Were gone. So it was "fit versus unfit," I think, were the words.

Bragg: Well, that's probably an extreme, but 4-F was the classification, physically unfit. And generally if you found a guy who was of that age who wasn't in service, he was either very valuable to the war effort—maybe he had 10,000 children or something like that, sometimes that would get a deferment—or he was 4-F. Not that they didn't make out, I mean, something is better than nothing, and sometimes their 4-F qualification wasn't that life threatening. But nevertheless, the point was that men were scarce, and eligible men were even scarcer. So it gave you kind of a leg up if you could make connections. The point was that what they would do often is go to service clubs where soldiers would come, but basically churches are a much better institution to—or social class.

Anyway, an interesting story like that I didn't tell was, to show you the reverse—funny thing about discrimination—. Because housing was so hard to come by, hotels or motels or whatever—first of all, they weren't even available to us for the most part except where there was a big black population, there might be a black hotel. So where are you going to sleep at night? Go to the service clubs, they would usually have bunks and whatnot. In Providence they had one where you would go early if you want to sleep there and sign up, and that way they would reserve a place for you, just like you reserved a hotel. So I remember this time we went by this place and signed up. We'd go out to parties and so forth and come back at two o'clock in the morning, whenever it

was. By this time most everybody is asleep; things have come to a halt. So we get back and there are white soldiers on the floor all over there, just sleeping anywhere there is a place to sleep. And we know damn well we are here late; we are out of luck. But no, there is a room back there with four beds in it [laughs] that they've set aside for us, and they kept it! So we walk over these white guys! It's one of the few times that discrimination carried to its end without regard to rank or whatever [laughs], worked in my favor.

Basically, I would guess that ordinarily when a place filled up and we haven't shown up, those places would have been gone. But no, they kept them. Maybe they didn't know, maybe they hadn't put "Colored" on there when they took the reservations. But the places were there, and so—. Well, [laughs] sometimes you get lucky.

Anyway, the experience at Rhode Island was that we did no fatigue duty, we just went to class. My class was, as I said, fifteen or twenty guys, otherwise all white, mostly Jews from CCNY, City College of New York, which is a fantastic, at that time a fantastic public school for turning out really bright immigrant lads or first-generation American, mostly Jews. With the whole Manhattan accent and all that. Really bright, brash, irreverent—they questioned everything, naturally, and the smarter they were, the more they questioned. And sharp wit. It was a lot of fun being with them.

Wilmot: Did you take any good friends from that group of people?

Bragg: Never did. There was one guy I got along better with than most, because he was politically more savvy. He not only was in the army, I guess the best word is, he's politically savvy. I think he was a Marxist. I'm pretty sure he was, actually. He didn't say he was, but from the way he talked, deifying the struggle of the Russians against the Germans which was just very big then, and very important, I might add. But he could regale you with stories of workers' strikes and things like that that I didn't know anything about. Trials that I eventually read about when I read the novel *Darkness at Noon* by Arthur Koestler, which since it deals with trials where people would get up and confess to crimes against the state, and they would convict and execute them. Anyway, but he was familiar with all that kind of stuff. Most of the others were apolitical though, but as I say very sharp.

That program went on—the social part was nice because, as I said, Whit had these contacts, girls in Boston, girls in Providence, and whatnot. So we were eligible and we enjoyed that. I don't remember the names of the girls, probably they are all married and gone now, or dead. But they were nice, and I enjoyed it.

But it only lasted three months, one quarter out of a whole academic year. The program was discontinued, I say killed, for purposes of the army. And the basic purposes I've figured it out was that the reason why they had the programs in the first place was to provide a continuing supply of college-educated soldiers for the war effort, because some jobs, it was very difficult without college education to work at that level. Especially in the technical areas. You know, there's only so far you could go.

Now, the navy had a V-12 program which did the same thing—it was earlier, they had been doing it all along. The navy has a lot more technical service than the army, there used to be, and so right away the army, engineering schools and so forth, they navy had

V-12 programs. I had a black friend who went to one of them, right at IIT in Chicago, where I went to school. He went to the program and got his degree and served on a ship. People didn't know that actually happened.

But the army had set this program up for the same reason, to have a continuing supply of college-educated men, guaranteeing it. If you didn't let them go to college in four years' time, you don't have any coming out, see? Well, apparently the war effort was getting to a point where it was clear that foreseeable demands could be met with what was available, and so there was no need to continue that program. And that would be the reason for killing that program, or any other program, for that matter. So that was the fate of that one.

In the normal course of events my group would have gone to Fort Monmouth, New Jersey, to the signal corps, because we were in electrical engineering, and that's where it belonged. And many of the other guys knew damn well that is what was going to happen to us, and I told them, "No, that will happen to you, but it won't happen to me. Well, there aren't any significant number of blacks in the signal corps, so I won't be there." And they couldn't believe it, but that is what happened. They went to Fort Monmouth, and I went to Camp Lee, Virginia, to the quartermaster corps. That was kind of a bummer, because now I'm back in the South again. I had had a three-month respite, but now I'm back in the South. Not quite as far South, but still in Virginia. Fort Lee—Camp Lee it was then, now it's a fort—was a big quartermaster training center. Even had an officer's candidate school there. All kinds of technical schools. Trucking companies, cooks and bakers. They probably made tailors, or shoemakers, or whatever, all those things that had to do with your eating or your sleeping, everything but your guns. That was ordnance, and that would be another corps. But basically quartermaster, it is a big part of the service. That's where they had all these training for officers, and also the technical schools. That was where most of the blacks in the army went. Most were not in the infantry or the air force. Most were in the army, and in the army most were in the quartermaster corps or engineering, which was mostly labor. That's the way it was, and it's probably still true.

Well, at Camp Lee I wound up in Company I of the 9th Regiment. Company I was a catch-all for people like myself who they didn't know what to do with right then. Having no new assignment to a technical school like—they had to send me somewhere. They couldn't just send me home, [laughs] which I would have liked. What you do is, you send them to some kind of a collection point where they just sort of keep you there until they figure out what to do with you. What I ran into there, in my particular barracks, as a matter of fact—a barracks would hold about fifty men—was a bunch of guys who had been at Kessler Field in Biloxi, Mississippi. Kessler Field was a pre-flight place where they brought guys in and took them through a very rigorous physical preparation, preparatory to going on to flight school. Now, they had to be very great physical specimens, otherwise they weren't going to go. And they were. These guys were just outrageously, not macho, but physically fit. And pep! You know, lots of pep—they wouldn't walk anywhere, they wanted to run.

Wilmot: [laughs] Oh, no.

Bragg: Yes, I know, [laughs] but that's the way that they—they had to show that kind of spark, otherwise they weren't considered with the program. So, yes, civilians can't see that.

But the military wants you to be ready to run, [laughs] at least for that function. At any rate, there were also some veterans there who had come back from North Africa. We had just landed in North Africa at the time, and some of these guys, I don't know why they were sent back, but maybe they had so much time in service that they were rotated back, and now they didn't know what to do with them. And I remember these guys as being so unsoldierly. They didn't give a damn [laughs] what the permanent party said to them, within reason.

The permanent party is a group of guys who are there who run the programs. Trainees come and go, but they are there to move them around train them. And usually they are not veterans of overseas experience, so [laughs] the guys who have been over know that, and they don't despise them, but they don't have any high—they're not intimidated by them. So it was very hard for them to give any orders that were going to have any meaning unless there is some real muscle behind the orders.

[interview interruption, **disc 5, track 1]

So they'll get right up to this guy's face, almost insolent, but [laughs] never break an army regulation. These guys were like that. They knew exactly how to deal with these permanent party guys. A guy would come in, "I'm not going to do that." I mean, what's he going to do, put him in jail? Go ahead and get the guard? It was kind of ridiculous anyway. And these guys, they had already seen a lot of action. So the best thing to do is just don't mess with them. After a while they just left them alone.

Yes, they knew the army regulations very well. They knew just how far a noncom's authority would go—and officers, for that matter—and they would, while not being insubordinate, they were not tolerant of a lot of nonsense. So a lot of things that got done because of misplaced orders or whatever, that we would respond to, they just wouldn't do it. So after a while the best thing to do is put them in another barracks and [laughs] leave them there. But that left us, us meaning the driftwood from these crashed, these discontinued programs.

Wilmot: Okay. I wanted to ask you a little bit, you had mentioned that many of your co-servicemen, many of your other squadron mates—I'm not sure of the correct language, but—

Bragg: Well, other GIs.

Wilmot: The other GIs who were also from that 99th error?

Bragg: Oh, yes, there was, oh, maybe thirty or forty guys who had been—they didn't get to the 99th, they would have gone to the 99th had they gone on to flight training. But see, what it is, guys were selected for the air force pilots' program at that time. They would go to a special orientation and go through physical training and tests, which now test their adaptability et cetera. But basically it was a physical kind of thing with not too much skull practice associated with it. At the 99th, at Tuskegee at that time, that first place where all the first experiments were run, they got flight training, but they also went to school. In fact, a friend of mine taught physics, a Tuskegee airman, Warren Henry. So they were hoping to go to Tuskegee, but apparently the air force had decided that they had enough guys waiting to be trained, that they didn't need to send them on,

so they had to find something to do with them, and that's why they were in that camp. They weren't sent to engineers'—some of them might have been, in some other time, but there they were in the quartermaster corps with us. So that was just the way it was.

As I say, they were the fittest group of black men I have ever been associated with in those numbers. And bright, they were all—they had to be smart to even be considered to be pilots.

[interview interruption, **disc 4 track 1]

Wilmot: You were describing to me the function of the quartermaster corps, especially in contrast to the—

Bragg: Signal, which had training at Fort Monmouth, New Jersey. One backtrack, the ASTP was a kind of an elite program in that it scalped off the top of the distribution, and it had an interesting insignia which consisted of a shoulder patch with the lamp of knowledge, and it had a flame coming out of it, and a sword of justice. And the description that the soldiers used was "a flaming piss-pot." [chuckles] So the flaming piss-pot is what we were all about.

The Camp Lee assignment was for retraining of people who the army had taken out of some other programs, had killed them, mostly, and now, 'What to do with these guys?' Got to put them somewhere.

Wilmot: Once the programs were discontinued.

Bragg: Yes. You can't just throw the people away, they were good people. There were two basic sets, there were a bunch of cadets who had been air force pilot candidates, who had gone into the air force and had completed the pre-flight training at Kessler Field in Biloxi, Mississippi. It was the fittest bunch of young black men that I ever saw. They were fine, there was nothing wrong with them. But the air force had decided they weren't going to train any more black pilots. So that was what the situation was.

So through no fault of their own the program may have been killed, and they were sent there to—something to be done with them now that that's over. There was one other group, not much larger, but some veterans who had come back from North Africa—they had already had some small skirmishes in North Africa at that time. The interesting thing about them was that they were so hardened, comparatively, to military discipline and so on that the permanent party, the cadre that operated this, this company, who were practically fresh soldiers, had never been overseas anywhere, they could do very little to control these guys except—in other words, they couldn't intimidate someone. So that they for the most part pretty much left them alone. So they sort of, they had been there at Oran, landing at—I forget where it was, but—anyway, they had these guys, and the had then cadets, and occasional guys like myself, who had come from odds and ends of programs. So, not knowing what to do with you, the army would send you back through basic training again.

So, now here are guys who have been in the army two, three years, some of them master sergeants, one of them I remember, a master sergeant, who had run a company like the one we were in. And now we are going back through basic training, that was the army

way. [laughs] You can imagine the enthusiasm that we had for this. And it was run by a young second lieutenant who probably hadn't been in the army as long as most of us. Well, naturally, he didn't try to throw his weight around, it would have been silly.

Wilmot: What was his ethnic background?

Bragg: He was white. Yeah. A nice guy but—in the whole company, I didn't see too many black officers around there, in fact don't recall seeing any around there. There might have been, must have been some. But the noncommissioned were black, this was a segregated regiment. The officers were white.

So there we were, going through basic training, but now, because it was so boring, what he did was to essentially take us to the same basic training that he had gone through as an officer candidate. So this was a rather more complex demand on our thinking and so on. If you ever watch movies of the West Point cadets marching, you've seen these formations of guys who are marching along and all of a sudden one group will go that way and another group goes that way, and they sort of split apart like that. Then on the command they all reverse and come back in perfect step and so on. Well, we were doing things like that that you would never see, because, well, after all we're all rather bright, and also we're all rather experienced, anyway. So, that was to take the boredom out of it.

But eventually, the next cycle of technical schools opens up. The schools ran in cycles. So many months, a week for this, so many weeks for that. And now the thing to do is to put these guys into different schools.

Wilmot: I have a question.

Bragg: Yes.

Wilmot: So when all of those programs were killed, and I'm using—I thought I heard you say killed—

Bragg: Yes. Discontinued. [laughs] I say killed.

Wilmot: What precipitated that, and also what precipitated then the new cycle of schools?

Bragg: No one consulted me on this, but knowing how the army planned—there are people who are fairly bright, incidentally, the army is not totally devoid of brains, by any means—who are making their plans in training people whose job it is to plan for what the army is going to do next, and next, and next, and next, and next. Along with this, there is a tremendous logistical problem. You don't just land guys on the beach at Normandy, just call them up and say, "Show up at 10:00 and we're going to go across there and kick these guys." You're going to need trucks, you're going to need guns, going to need bullets, going to need food, going to need mess kits, helmets, socks, petrol—it's an enormous logistical problem.

So it took the very best people who come in from industry into the army to run those programs. But that means there is a lot of planning and in order to provide the skills that go with these things, let's say a truck driver, well, maybe it takes—if you know how

to drive a truck, maybe it only takes two or three weeks to become a competent truck driver. But if you're illiterate, it maybe takes a little longer. So everything is pretty much pegged to the lowest common denominator. Some skills may take ten, twelve weeks, half a year. But most of them were—maybe two months or less, something like that, after the basic training of three months.

So having done that, the demand says we're going to need so many guys who fix shoes, and there's a shoemaker school that takes so long to run. In order for us to have the shoemakers ready by such and such a time, we have to start back here training them. Now, if the personnel in the army at that particular time when the decision is made happened to include shoemakers already, great, we just put them all over there. But if there are no shoemakers, then people capable of learning to be shoemakers will get trained to be shoemakers. Now, a shoemaker could come into the army later, they won't put him over there and take the other guy out [laughs], he might have got trained to be a cook.

So that was the way the army operated. Maybe it's better now, and maybe more—attention was paid to that then, but I'm saying that they ran these schools in cycles depending upon plans which are looking way ahead, sometimes something like a year or so to what you're going to need that far ahead. That dictated killing the college training program, for example. That dictated cutting out the black cadets program. They weren't going to make any black pilots, so it was no sense in sending them through that school. So that's the way that—the rationale behind when these things were done.

Wilmot: It's interesting to me that there was a time when they thought that they would have black cadets, and then they—.

Bragg: Oh, they did. What had happened was that as an experiment, to begin with, the 99th Pursuit Squadron was formed at Tuskegee. It was headed up by, I think, Captain E.O. Davis, Jr., who was the first black to come through West Point in modern times, we're talking about 1940, thereabouts. He was a West Point graduate already, and normally would have wound up, and did, for a while, wind up as an infantry officer. But flying was coming in, and that looked attractive, so he applied for flight school, and managed to get in. So he had learned to fly, and being a regular army man, he was one of their own you see, he is a logical guy to head up this experimental unit. He was bright as all-get-out. He practically went through West Point without making a single friend. That has got nothing to do with brightness, I'm just thinking about the type of guy he was. Remarkable man. His father was a military officer and had become a general, the only black general in the army when the WWII broke out. In fact, he wasn't even a general, he was just a—yes, I guess he was.

But, so he knew the military life, he had been trained for it. When the time came to be appointed to go to West Point he was well trained already, and had gone to University of Chicago to take a decent course in mathematics and so on, because that killed a lot of cadets. So he just marched right through, but without any social company. They gave him the silent treatment, except in line of duty. Nobody spoke to him for four years. He's a tough guy, to do that. But anyway, he didn't apologize for discrimination; that was part of the army. He was then the guy in charge of the 99th Pursuit Squadron, which is about the lowest level, lowest size of any unit that you could make. The idea was to test the notion that blacks could fly. Isn't that interesting?

Wilmot: Yes.

Bragg: Now, that's the mentality then. Well, you've probably seen this documentary. It plays time and time again, about the 99th and what they went through in terms of—

Wilmot: I haven't seen it, but I'd like to hear about it.

Bragg: Well, essentially the program was set up—if not to fail, to give it very little chance of succeeding. So what they did was to bring in flight trainers who weren't that enthusiastic about teaching these guys to fly, because they hadn't been accustomed to blacks flying anywhere. I told you, my uncle had already flown in '35, but anyway, that's another matter. And the cadre was mostly white, because there weren't that many black pilots that were that highly experienced. So the flight instructors were white for the most part, and so were the mechanics. In other words, it was in the heart of the South, in Alabama, Tuskegee, Alabama. It was a segregated unit, there weren't any white cadets there.

But they did manage to get a little help from—the story may be overblown, but Eleanor Roosevelt, who had gone there. There was a constant, if not bickering, a criticism of the way the military treated these cadets, went about the whole question of integration, the under-utilization of skills on the part of black servicemen. Programs like that of course are high visibility, because now we were going to fly and shoot down people. So it put a lot of pressure from the black press to go down there and look and see and come back and raise hell if things didn't look right. I don't know how Mrs. Roosevelt wound up down there, but she did and insisted on being taken up by one of the black pilots. That shows up in the film, incidentally. I'm not sure what else that did, but they did essentially survive this first acid test.

Then that group moved to Selfridge Field, Michigan, I think it was, and they formed four additional squadrons. That group moved to Selfridge Field, but they continued to train other pilots there at Tuskegee. For how long I don't know, but it has got to be somewhere not too long after the time that I'm talking about, because they stopped the pre-flight school at Kessler Field. They washed them out.

The 99th became a part of a fighter group, a fighter group I guess it was, and went to North Africa, fought through the Italian campaign, became famous for never losing—very often flying escorts to bombers—and they became famous for never losing a bomber to enemy aircraft the whole time that they were there. They succeeded so well at that that bomber groups began to ask if they could have these guys to come and escort them, not knowing that they were black. The planes didn't say "black" on them.

Anyway, that was an aside, but the point was, you asked a question about killing programs. Killing the programs themselves had to do with back end plans in training. You have to plan, you have to train, and so on. Well, when the time came—a new cycle of technical schools comes up, I could just as well have wound up in a trucking company, or cooks and bakers school, or something like that. I was only a private still, mind you. Private first class. But I got assigned to the quartermaster laundry school. And the reason was that the quartermaster corps had formed these mobile laundry units, and the reason for that is that people get dirty. [chuckles] And you don't necessarily have a laundry where you're going. In fact, very rarely would you find a laundry

anywhere you were going that you could put your clothes in. And basically the main function was to set up operations somewhere in the zone where people have come out from combat to rest. They had essentially been relieved for a certain amount of rest. You would come in to the facilities with all your mud and dirt and everything, turn all your clothes in, and go through and take showers. And they would delouse you and so forth, because lice were quite common, wearing your clothes for days on end. Then they would issue you some new clothes out at the other end, so you would be there all cleaned up. The way to do that, in the field of course, is to have everything on wheels. So wherever it happens to be, just roll up there, set your trucks up, set up your tents and everything, and away you go. The power supply, the power system, all that is self-contained. So every one of these vans for the washing was on a trailer that had a motor generator set that made electricity, a boiler that made steam and hot water, two machines for washing clothes, and two dryers for drying. So they had these laundry companies; they already existed. But now they decided to make some laundry detachments which essentially would do the same kind of thing, but instead of being assigned to rest areas that I just mentioned, would be attached to places like field hospitals or general hospitals, because there you have a lot of concern about clean linen.

Well, I got assigned to that school. I guess originally because I had a technical background, they decided that I should be a buck sergeant, and be in charge of mechanical things, such as get the motors going and all that kind of stuff. But I don't know, somehow I guess I did so well in the school that they scrubbed that out and made me a technical sergeant whose job it was to run the whole operation. As a matter of fact, after a while I was teaching in the school; it was just that simple a course. So after that cycle went through, all of a sudden, I jumped from private first class, that's from one stripe, to five, to technical sergeant, and in charge of one of these little detachments. They had about twenty to twenty-nine men, whose job now is going to be like an accessory to a hospital or wherever it is we would be sent. It wasn't a terribly eventful experience at Camp Lee, memorable or otherwise, except people you met. I guess I mentioned the unusual nature, the physical fitness and the brightness of the cadets who had come from the pre-flight schools.

After hours there wasn't much going on. People could go up to town to Petersburg, which is famed for Civil War battles that had been fought there. But there's not too much fun associated with being in a town where essentially it's one big red light district. I didn't enjoy that much.

It turns out though that by the time I had gotten back from having gone to Rhode Island and now back down South to Virginia, the young lady that I had met at the ASTP unit now had a civil service job in Washington, D.C. Well, that's not too far away from where we were in Virginia. So after a while, after I was able to get passes to go up to Washington, D.C., and spend the weekend, which really made life rather pleasant. I guess that was the only thing. Oh, and I met some guys that I knew from Chicago, it was a big, quite a big quartermaster place, so you did run into people that you knew there, whereas normally you might not. Other than that I don't have any fond memories, particularly [laughs] of Camp Lee, Virginia.

Wilmot: Okay. You did tell me an interesting story the last time we spoke about when you were in the Philippines. As a technical sergeant of the laundry detachment, that meant that you traveled a bit, is that correct?

Bragg: It only meant that I traveled wherever they traveled. But that didn't bring any particular benefits, it was just part of the routine. All it meant was I was the guy in charge of all of its operations.

Wilmot: How long were you part of part of that laundry detachment?

Bragg: From the time it was formed in, I guess it was early '44, or no, it has got to be late '44, until—about a year I guess, maybe a little more than a year.

Because we went overseas, after we were formed, with no particular designation in mind. Then we trained a while as a unit. First you had gone through school as individuals, everybody learns their job. Now you put the whole thing together as a team, operating the whole thing from beginning to end. And now the presumption is that you're ready to go and do some work, do whatever you're supposed to do.

So we got shipped off, it seems to me it was like coming in the fall, I don't remember exactly, but it had to be late fall. We got paid before we went on this troop train. We're going now from Virginia to California. We don't know where we're headed, but it was far. We knew we were going to the Pacific because we were—no, I guess we didn't know yet, we didn't know yet.

Wilmot: So you were on a train going someplace not knowing where you were going?

Bragg: Well, [laughs] they just tell you, "You get out here, and that guy is going to tell you what to do." That's the way the army—that's the way it is now. Well, you might know that you're going to go from A to B, but we didn't even know that on this troop train. Somebody knew, but we didn't know. There were maybe ten of these groups, several hundred men altogether to make up this one train. Coming across the country, I remember that—everybody just had gotten paid before we got on the train. So all the money that was in the payroll is on the train. Now it's up to the gamblers to redivide the money. So in every car, maybe half a dozen of these sleeping cars, they had mammoth crap games going on. [laughs] Thousands of dollars of craps! Because everybody got paid, and although each person didn't get very much, by the time you multiplied that by twenties and so on, it gets to be a reasonable amount of money. What the gamblers did was they would not gamble with each other, which is stupid. Gamble with the "chumps," they'd call them, that was the term for the guys who weren't very skillful. So they would set up camp, or rather set up the games and gamble until they essentially broke all the guys who didn't have much money. Now they would kind of relax and decide whether or not they wanted to gamble against each other. So that's happening all the way across the country from Virginia to California.

Nothing eventful about that coming back this way, except—no, nothing, really. We got into Camp Stoneman up here, it was near Pittsburg, California, that was a temporary camp there, then. And kind of late at night, actually, I don't remember what happened except that the barracks chiefs, the soldiers who were the permanent party there, there would be bunches of guys coming in, they would get new clothes and all and they would go out—the permanent party is still there. Well, these guys were—it was their home, that's their job. And many of them were great gamblers. So when guys would arrive off the train with this money, they would try to take it from them. I remember I had one guy in my outfit whose name was Fleming, he was a corporal by then. An old

man, he was thirty-eight. So he was the dregs [laughs] of humanity by then. But Fleming had been an amateur (semi-professional gambler) as a civilian. Fleming has been gambling coming across; he has won quite a lot of money. I remember that we were upstairs in this barracks, and some guy comes up, "Fleming, Fleming, there's a guy downstairs who's breaking everybody!" So Fleming said, "Well, if he's doing that he must be cheating." [laughs] Well, it turns out Fleming wasn't above cheating, himself, but he was smart enough not to go down and let the guy cheat him. [laughs] The way he said it was so funny, "Well, he must be cheating."

Wilmot: Were you a gambler?

Bragg: No. Fleming tried to be persuasive, "Look, Sarge, let me teach you how to gamble, you should go home with some money." I said, "No, no, Fleming, no thank you." But he volunteered to help me. For example, this came up later, we were on shipboard, when we had shipped out, on the deck of this ship. What had happened is that many of these country guys who had only just shot craps up to that time had discovered poker. I mean, blackjack is one thing, but poker is another. It is a step up in the whole hierarchy of gambling, you see.

So Fleming, who had been a fantastic crap shooter—not knowing the game, of course, you can't appreciate the skill—but if you ever go to a casino and see the game of craps, of dice, there's usually a long table, which is barricaded, it's got felt padding on it. To throw the dice, you must bounce them off the wall. If they don't bounce off the wall, it's not a legitimate throw. The idea is, the dice should have no recollection of what went on before were thrown. Because if it can remember what you did, then of course you might be able to control how they fall and win that way. So, that's the way the casino operates. But these country boys, the way they operated was would put a blanket on the floor, a typical GI blanket, and roll the dice but didn't bounce them off the wall, didn't insist on that. Now it meant that, if you had a certain manual dexterity, you could actually control the way the dice would fall when they stopped rolling. It's fairly simple. With a pair of dice, if you juxtapose the spots in a certain way, you can make the dice roll over side by side like that. You can arrange them so that it will either come up your point or a point that's not going to bust you out. So, a skillful gambler will practice hours picking the dice up so that it doesn't look like he understands what's doing. [demonstrates] And then hold them in such a way to—it's like being able to palm, deal seconds or whatever. But, anyway, Fleming was a master at that. He could roll them this way and he could throw them that way—three or four feet out there and have them come out the way he wanted them.

Well, they caught on to him after a while, I mean he always won. So after we had got on shipboard—I've jumped ahead a bit, one day we were out on top of the deck sitting on a hatch cover or something. It's a nice day out there, nothing out there but us and miles and miles of Pacific Ocean. He said, "Sarge, come here," said, "These monkeys think they're getting smart, they want to play poker." He pulls out a deck of cards, he had written home to his wife to send him a deck of cards. And he starts dealing these cards and telling me what they are. They're marked! [laughs] Anyway, the point was that he was not above cheating.

Wilmot: He was dealing them to you face down and telling you what they were.

Bragg: Yeah! You can buy such cards from trick stores.

But at any rate, that was the situation. We were gambling all the way across and when we got to Camp Stoneman we discovered we were being readied—we were given tropical clothes. We ain't going to the Aleutians, that's for sure. And we're not going to Europe, that's for sure. So we know we are going to the Southwest Pacific. We don't know exactly when, but we know we're going. And now the question is to get shots. Cholera, tetanus, whatever it is that you might get that you might be immunized about, that's what was done.

You were given lectures on savings, and I went down and took out an allotment from my check to the bank so that I wouldn't even see the money, that way I couldn't very well throw it away, if I never got it. I managed to save \$3,000 that way before I came out in 1946.

But then that was quite a lot. And the reason was that I had determined if I ever got out I wasn't going to fail to go back to school because of lack of money. I don't know if the GI Bill had been passed at that time, but the point was, if I did survive, I would survive with money and go back and finish college, that was really a determination on my part. So I took out just enough money to buy cigarettes and stuff like that.

Wilmot: I have a question, which is how did—you've described your two years at college and then a year after that, you particularly describe as a drifting time. What was going on with you that you moved from drifting to just saying, "This is absolutely, definitely where I want to be"?

Bragg: When I got into the signal corps training program it was fascinating to be learning again. It's a fascinating new field, you see, I didn't know a thing about radio at the time. Radar had just been invented, in fact, I didn't ever work on any radar. But the whole field of radio communications, and electronics, electricity and magnetism, in particular, applications, was so fascinating that I said, "Gee, I love this! I don't see any point in being a mechanical engineer, that's boring, comparatively. So if I ever get out—" I had made up my mind with that while I was in the program. "Boy, now this is for me! I like this! So if I come back, this is what I'm going to do." Now, I had made sure I could do it, it had gotten around to where I had a substantial amount of money coming in as a technical sergeant. I think my pay was something like \$105 a month, something like that. [laughs] Well, the basic private's pay was thirty. But anyway, whatever it was, I allotted just enough money to have cigarettes and beer and whatnot. The army feeds you, gives you clothes, you know, you don't need a lot of money. At least if you don't have children or whatever. But I took out, I think I bought a war bond to give my mother, every so often she would get one of those, but basically I saved.

Wilmot: So you were a smoker back then?

Bragg: Yes, I smoked. Drank too. [laughs] A carton of cigarettes, for ten packets it would be fifty cents, that's because there was no tax. Fifty cents for ten packs of cigarettes!

After the orientation and outfitting and all that, shots, because I was in command of a group, I couldn't get away as quickly as the men did. But I did manage to get one pass to go down to San Francisco. My second in command was a buck sergeant, name was

Arbuckle, James Arbuckle. He and I went down to San Francisco. It was kind of damp, and not terribly impressive. I didn't have the impression of San Francisco that I have now, for sure, because it was kind of raining. I'm sure we were down on Fillmore Street somewhere, because the Japanese had just pulled out, had been pulled out of there, and the blacks and the navy had moved in there, and that's where all the jazz joints were. So that's where we went, naturally. We asked a guy at the bus station, "Where are the black people?" and he said go down there. So that's where we went. [laughs] I did manage to have one overnight and back to camp, and I think the next day or two we were gone.

We were put on a barge from Pittsburg, Camp Stoneman down to Fort Mason in San Francisco, down the Sacramento River from Pittsburg. And no sooner had we arrived there at this Fort Mason—it's a long dock—there's a great big ship over there, across on the other side. We tie up on this side, there's a big ship over on the other side, and there's a guy over there with a roster checking your name off [laughs] as you climb up the gangplank to go on this ship. So we, that was the last we saw of San Francisco until, in my case, until ten or fifteen years later.

We were on a cargo ship, turned out there were about 1,500 of us altogether on that ship, which had been converted to passengers. That ship was—we were all quartermaster troops, some were trucking companies, a few were like ourselves, but mainly they were trucking companies. We were together for twenty-seven days at sea, altogether. Now, it doesn't take that long to get from San Francisco to New Guinea if you go straight.

Wilmot: And again, you didn't know where you were headed, or you did now?

Bragg: Had no idea. [chuckles] We knew when we got to Pearl Harbor, because they told us. We anchored there in the harbor for a while. I guess, again, so much is going on, naval battles and submarines and stuff like that, that you might even get put into a convoy, in which case you have lots of battleships and destroyers and cruisers protecting you. Or you might even go as a single unit, it might be considered safe enough to do that, depending on the situation, which is rather fluid. Because they had all these battles like Midway and all that. Mainly we hung around Pearl Harbor for a few days and then struck out.

And now we're totally alone. There's not a thing in sight but us for miles, and days. After a while we got way out there, the fish would come along and fly by, it was quite a sight. They aren't great big fish, they are fish about so long. You've heard the song, "On the road to Mandalay, where the flying fishes play—" It was that kind of fish. So it's kind of lazy.

But the first day or two was awful because just about everybody got seasick, and guys are throwing up, it's a pretty messy situation. I never got seasick.

We were stowed in the two decks, two layers down from the top deck. What they had done is gut the thing from cargo, build in some bunks, some metal supports, and canvas webbing. Your bed was just a piece of canvas, and I think we were about three deep, so there would be one guy here, a guy in the middle, and a guy up there. You hang your duffel bag with your clothes on the end there and you sort of climb up there and go in sideways.

Wilmot: It was like a hammock

Bragg: Yes, except it didn't swing. [laughs] It's tight. Well, some guys, it took quite a while before they got legs enough to get up on the topside. But I managed never to get sick. So it was kind of foul, the ventilation there wasn't all that good either, it got to be rather smelly.

But for twenty-seven days altogether now we were at sea. At night, after we had gotten out quite a ways, to add some spice to the thing, the ship administration made the ship's PA system available to individual units. You might have a trucking company, say 150 men or something like that, they would put on a radio show, use the radio. So different units had different times. The thing I remember about that is that practically all these guys are from the South, the Deep South, and they all know the same songs, and they all can sing. By that I mean, not everybody can sing, but it's quite common, they sang a lot. There was one song that I guess I—it was hard for me to listen to it now. The words go, "Over my head I see glory in the air," something like that. "Over my head, I see glory in the air. Da-da-da-da, da-da-da-da." [sings] I heard that thing about every night for probably [laughs] about ten or fifteen nights, got sick of it! But that was part of the entertainment. And they would have talks, interviews and stuff like that, pass the time.

I think when we crossed the international date line, I'm sorry, crossed the Equator, that was interesting—I've crossed the Equator several times since—but the only time when we had a nice ceremony. The idea is that you—I forget the whole ceremony, but basically you walked the plank. And the person who is going to be the inducted into the Society of Neptunes is blindfolded, and he thinks that he is going to end up falling into the ocean somewhere, whereas in fact they've got a pool set up on the deck and when he steps off he just falls in the pool. Well—[laughs]

Wilmot: That sounds like torture.

Bragg: Well, you know they're not going to kill you, but—

Wilmot: But it sounds like a very—it sounds like psychological hazing!

Bragg: Well, yes, I didn't see it that way—. Everybody knows it's in fun. It's not meant to victimize anybody.

Wilmot: So it's just play-kill fun. [laughs]

Bragg: Yes. Well, the people who walked the plank very often would be people with rank.

Wilmot: Okay.

Bragg: So you know right [laughs] away they're not going to kill them. Well, it was just part of the whole notion of crossing the Equator, it was a big deal. Not everybody did it, of course, you would be reading statements of wheres and wherefores and King Neptune would come up with his sword and whatnot, it was a big deal. As I say, I've crossed the Equator several times since then, but I've never seen any kind of ceremony like that. One time I flew and they gave me a certificate that said that. But I think the last time they didn't give me anything, it's just become so common.

Wilmot: Who originated this ceremony?

Bragg: Oh, I don't know, it probably goes way back to early seamanship.

Wilmot: It was just part of military culture?

Bragg: I don't think it was military, I think it was just seamen. But all that, and then that boring song, that was it until we got to—we and my group, we got to New Guinea.

We were put ashore early this morning, we were fed very early. Incidentally, I'm not sure how this has any historical significance, but the—well, okay. We were put ashore very early in a landing craft. You must have seen some war movies where men are standing on the deck of a rather small boat with a front that lets down when it goes up to the land, and the front lets down, and you walk out. Typically into the water. [laughs] Not terribly deep, but—. So we were put ashore, several of them, two or three of these laundry units were put ashore there at a—it wasn't really a dock, it was just a little jetty that had been built there, which wasn't very large. Where we landed, there were a bunch of black engineers, not quartermasters, but Corps of Engineers. They were building a dock a little bigger, to land cargo from small vessels, not big ones. Ours was moored out there, anchored out there in the bay somewhere.

Well, the thing about that is nobody knew we were coming, or if so, nobody was there to greet us. Now here we are, we are in New Guinea, it's jungle, we're just standing around, nobody is there to greet us, the guys are there working, and nobody knows anything. Not only that, we were there from early in the morning until late that—until nightfall, and didn't have any food. We had been fed early, but nobody had lunches. We didn't have any rations that they'd given us. Some of these engineers found some army rations and broke them open and gave us some cheese and crackers or something like that, but basically we were hungry as all-get-out. Finally, when nightfall comes, now we don't know where the hell we are, this strange place, trees 3,000 feet tall it seems, and we could imagine everything! None of us have any guns! [laughs] We don't have any equipment, anything, we just have our personal gear!

But some trucks show up, load us up, and take us down to a camp. Which could have been done that that morning! We wound up in this camp, it's dark now, raining, and we don't know the layout of the camp at all! But we're told that "There are some empty tents down there, and there's a tent there with some cots in it, so go down there and get you some cots and go sleep in those tents. Up there where you see that light (about a quarter of a mile), there's a mess tent," that means food, "and they'll have some food for you." So we're slopping around, it's raining, it's muddy, not everybody has a flashlight, but finally we make it up to this mess tent, and it turns out that what they've done is they've got some loaves of bread, some coffee, some Spam, and some canned peaches, yellow half peaches, huge ones. I'll never forget it, because I don't like Spam. I did like the coffee, because that was hot, and the bread was good, and the peaches were good. But that was my welcome, that was my landing in New Guinea.

But the next morning the sun was out, and things look better after you go to sleep, after you sleep a bit, have a good night's sleep. It turned out that nobody even knew that we were coming, but eventually orders did show up saying we were there, which we already knew. But now they don't know what to do with us, so we got to just sort of

chill there until late spring. So we sort of hung around, and the adventuresome guys, the country guys, naturally they were at home in the woods, so right away they are off and scouting around. There were New Guinea natives there, who would come around the camp in old GI clothes—there had been a depot that had been abandoned, they could just go there and take stuff—they would climb trees, bring down coconuts, we would have coconut juice, and just sort of, just chilled.

The only thing unusual that happened there—well, two. One was that one night a guard challenged a strange noise he had heard out there, it didn't say anything so he shot it. It was a python. It was a long thing, I remember going out there the next day and one of these soldiers had his knife and he just started skinning the thing, was going to make a—I guess he made ornaments or something out of it. Well, [laughs] that didn't make us feel that good, but at least he had shot the thing.

The other thing was that one of my clerks, we were in this tent so long that in the moist climates like that mildew forms and things multiply real fast, you can get spiderwebs in a day's time. He had a tarantula set up camp, housekeeping, right under his cot, and he never did move it. He must have known something I didn't know, because I wouldn't have had that happen [laughs] around me! Guy's name was Samuel Harris.

But in due time we were assigned to go to the Philippines.

Wilmot: How long were you there?

Bragg: Oh, a couple of months, two or three, not very long.

Wilmot: Okay, and then—. So it kind of sounds like the army just didn't really know what to do with you.

Bragg: Not just me.

Wilmot: Not just you, but with that whole detachment—

Bragg: Sure. But we're only talking about—in the Pacific Theater, where the 6th Army, the 8th Army—. An army's—well, let me put it this way, I doubt if we had a million in that theater. And if we're talking about a thousand lost souls, that's one part of a thousand. So in the cosmic scheme of things, sure, it looks like they don't know what to do with them, and at the moment they may not with that small number of people. But it's not quite as chaotic as—our particular—being a small unit, you are more susceptible to fluctuations.

We were assigned to go to the Philippines, and we went to the Philippines. By now our gear has arrived, our equipment. It's loaded on top of a cargo vessel—

Wilmot: Your portable washing empire.

Bragg: Yep. Now, on the boat we didn't have any bunks below at all, we always slept on deck. I remember, we were in a convoy of ships, and that thing must have—God, it was as far as you could see, ships, several ships abreast, just like ranks of men marching, except ships. And out here there are destroyers. The idea is to protect against submarines. As

I say, the thing was as long as, as far as we could see, going up to where—. There is a lot of big fighting now in the Philippines, so now it's in danger's way, or will be.

Wilmot: It sounds like such an impressive sight, to see that, the lengths of ships.

Bragg: It is. If you're just impressed with size, even that's impressive. But if you're impressed with organization, that's also impressive. Of course, being technical, I'm thinking all the way, "How did they get all these guys lined up?" You know, if you're marching with a guy next to you, you can talk to him, and you can very quickly make adjustments. But if these ships are separated by some distance, you're not yelling over there, so, "How do they do all?" I never did find out, of course. But somebody is telling them go this way, or telling them to go this way, or whatever. And the security people out here are constantly herding us like we're a bunch of sheep or something. But the job was to get us from here to there safely.

We finally get to the Lingayen Gulf, which is at the northern end of the major island in the Philippines, Luzon, and put ashore there, and get sent to the town of Udaneta, U-R-D-A-N-E-T-A, Urdaneta in Pangasinan province, where we attached to a field hospital. We finally got a job.

The hospital is set up in the schoolyard in this little town, the school building, and the school grounds, we have tents in the playground where personnel were sleeping. Nothing particularly unusual about that. Attached to the hospital were the people like us, there were surgical teams, surgeons who just travel with their tools, and well, they needed a lot of surgeons. And people like that were all in there. We were working like mad, of course, to have a shower set up.

Well, let me back up. The only black troops in this whole setup is us. And believe it or not, although I'm only technical sergeant, I'm the ranking black person. I'm responsible to see that these guys function. But of course there are ranks above me. Nevertheless, I'm in charge of this detachment. Naturally it doesn't surprise us that we have our own tents, because we are a self-contained unit. But when they started to Jim Crow the shower, that's when the stuff hit the fan.

Wilmot: I remember you telling me about that, and how you actually had to go and face down someone who was higher ranked than you.

Bragg: Well, I didn't face him down [laughs], what I did was to remind him of what democracy was all about. I must have said—if I didn't, I'll say it again—I'm not particularly a courageous person [laughs] and of course, they weren't going to take me and shoot me. But I could have taken issue with this practice, which I did, with the understanding that just about everybody there who has got any rank is a Southerner, and we're in a Jim Crow army. And they can make life very, very unpleasant for you, very quickly, and nobody is going to say anything. So that's why I said I wasn't at all courageous, but it was just wrong, and it just seemed so wrong because it was unnecessary. There was no reason for it whatsoever that I could see, and that's why I did what I did.

I not only didn't suffer for it, I probably gained some respect, because when the time came to change the table of organization of the group that I had, to authorize an officer to do what I was already doing, then one way of doing it was to promote me, to make

me an officer, since I was doing the job anyway. But in order to do that they had to—I must have mentioned this—appoint a board to—I applied for a direct commission, then a board is appointed to examine my fitness for the promotion, direct appointment. And this board is going to be composed of officers who are appointed by a guy I've just given a lecture on democracy. [laughs] So you can imagine that I'm not all that sure I'm going to make it. I could do the job, but would I ever get the job? [laughs] That would be the question.

But I'd have to say, in both instances, Colonel Gench, who was the hospital commander, first of all saw that the discriminatory practice in the shower was stopped. He did that, and the board that was appointed was headed by an, I have to say, Atlanta cracker, who had a bad reputation for being nasty, was a soul of helpfulness in terms of—in fact, it was a kangaroo court, except in my favor. So that was how I got to be an officer without ever going to officers' candidate school.

Wilmot: And you were appointed a second lieutenant?

Bragg: Yes. An order from MacArthur's headquarters, saying, "Effective so-and-so, technical sergeant so-and-so is—." Essentially you mustered out of the army as a sergeant, and then as a civilian you were appointed as a second lieutenant. So I have two separations, one is from the enlisted men. But they don't leave you out there, you can't get away. [chuckles] So there must be something in the clause added so that at a moment between one and the other you can't escape.

Wilmot: So the way that you're directly appointed is you're pulled out of your first position and then brought back in, to a new position. But that's just kind of the administrative part.

Bragg: Right.

Wilmot: Okay. How did that change your day-to-day existence in the army?

Bragg: Not particularly.

Wilmot: Yes, okay.

Bragg: It did some things. It gave me privileges that I didn't have before.

Wilmot: Okay.

Bragg: It gave me rank, of course, and rank has privileges. In terms of what I did, it didn't really change much. But the people I hung out with now were quite different. Because before, you see, I hung out with enlisted personnel, and they were practically all black. But now I'm a black officer in charge of black troops, but typically in my—

What happened was, we were preparing to go to the invasion of Japan when my appointment came through. In other words, at some point the battle in the Philippines was considered over and my appointment came through, and I was attached to a quartermaster battalion someplace. This battalion now is going to go en masse to the invasion of Japan. We're getting ready to go, and then the Japanese surrender. So for a while there they don't know what to do with us, we're just sitting around there. They

don't know what to do with us, it happened so suddenly there are no plans for it. But you've got to go in and occupy them very quickly. So we went to the southern-most island in the Japanese chain, big island, [Kyushu]. No, Sasebo is the name of the town, Sasebo. There is a big naval base there. There, I think about all we did was to sort of hang around and learn to drink Japanese beer.

Wilmot: Well, let me ask you a question. What was a typical day like?

Bragg: What did you do? [laughs]

Wilmot: Yes.

Bragg: Essentially did nothing but drink beer. [laughs]

Wilmot: I guess, let me just go back first to say, so you re-entered as an officer, as a second lieutenant, were you the second lieutenant still in charge of the laundry detachment? But now you were—and so why do you think that occurred?

Bragg: Because the army changed the table of organization—why did they do it?

Wilmot: Yes, and then why did they pick you?

Bragg: Well, they picked me because I had all of the qualifications necessary for the job. And I'm there, and they don't have to bring somebody in to do that.

But in terms of the change of the table of organization, the tables of organizations are constantly changing. As technology and other things develop, the mix of people that you need changes. And it was found that these detachments, in the assignments that we had, we didn't need twenty-seven, twenty-eight men. We could do with twenty, because most of the time the guys were either sick or just goofing off. You couldn't keep them all busy. So that led to an interesting experience while we were still in the Philippines.

Before I got my commission—the change had occurred, but we don't have an officer in charge yet, I'm still in charge as a tech sergeant—some orders came down from the 6th Army headquarters to transfer six men or something like that of such-and-such grade, MOS [military occupation specialists], to a trucking company out in the San Fernando Valley. And what that means, usually, is that you have a chance to get rid of your fuck-ups. Well, if you can possibly do it, what you're going to do [laughs] is to get rid of guys who are for one reason or another—either you're going to send them to a better place, which this would not be, because it was going to be a labor gang, which was probably worse than us. They didn't even have to operate a laundry machine, just picks and shovels. So that was not a promotion for anybody, we thought. So now I called—I had two sections, and a sergeant in charge of each one—a conference. "Look, here's a chance to get rid of your fuck-ups now. I'm not going to tell you what to do, but we've got to get rid of Rucker."

Rucker was my T5, which is a corporal, but a technical corporal, not a line corporal, because he doesn't bust people, he's a technician. But a clerk/typist, basically. His job was to do our—he was our company clerk. One of the company clerk's job is to keep the diary of the unit. The diary of the military unit, however large or small, is a daily entry,

it's called a morning report, which details what went on over the past twenty-four hours. Every unit, no matter how large or small, does that. The morning report details significant changes. If somebody went to the hospital, he's now under another jurisdiction, so he's not with you anymore. If somebody died, he's gone. Or a new person came, that's recorded. Whatever it is, any change of status or any significant event gets recorded there, and that's how you get—the army histories are written. Well, but if nothing unusual happened, all you did was fill out your name, your unit number, and the date and all that, and you type in the narrative "No change." And right on the bottom I'd sign it.

Rucker couldn't make out a "No change" morning report without making errors. Now, in those days you didn't have computers, and you didn't have snopake. You weren't supposed to be striking over things, you were supposed to do it flawlessly. Of course company clerks very often would make mistakes, but—. Rucker was a nice kid, kind of—you know, maybe nineteen, eighteen, nineteen, something like that—(I'm twenty-something)—and a nice fellow, but just totally unfocused and he's got this rank, but he's not performing the job that goes with the rank. So he would make the morning report, and I'd find errors in it, "Oh, shit, I'll do it myself," and I'd type up the morning report. [laughs] And I agonized over what to do about Rucker. "But Rucker's not cutting it. There's a guy here who has got a private rank who can beat him." Well, I finally decided, "Well, Rucker has got to go." So we transferred Rucker, and we made up the shipment out in the valley. And for a long time after that I wondered what happened to Rucker. I hated to do that, but it was just wrong to have him hold that rank, and here is a guy behind him who is better. And it's not helping me any, it's not helping the outfit any.

So I'll jump to the punchline on this. Some months later when we're occupying Japan and I'm going down the street, somewhere, I forget where it was, but Rucker comes by in a jeep. He's a sergeant now, he's got a private or something driving this jeep. "Lieutenant Bragg, Lieutenant Bragg! Gee, I'm glad to see you!" It turns out that Rucker, although he is not so hot for us, is great for them! He is the intellectual practically in this group of guys who are practically illiterates. So for them he's quite adequate. So much so that he got promoted! So far from—I expected Rucker to be angry with me, he was simply delighted. "You couldn't have done me a better favor!" [laughs] The moral of that story is you never know how things are going to turn out. You can agonize over the scene only to discover that it wasn't that bad at all.

Wilmot: Sometimes there's something about just having the reality be there that actually makes good things happen, even if it doesn't feel comfortable in the beginning.

Bragg: Yes. Tough love I think is the same, sort of in the same category. Not quite the same, but certainly people often put off tough decisions—parents, it comes from parents, I think, raising your children, not being tough enough with them and so on, and raising mama's boys or spoiled children. I think I've got this right, the idea of tough love is that that's wrong, because what you do is to prepare them for an unrealistic—raise them with an unrealistic expectation of how the world is going to react to them, and not everybody else is going to think Junior is all that great if he's lazy. I think the name pops up more in connection with substance abusers.

Anyway, the Rucker incident was one that taught me a lesson about agonizing too much about what happens to somebody, because you never know how it's going to turn out, it may be the best thing in the world that could have happened. Certainly in Rucker's case up to that point it worked out just fine.

Wilmot: As someone who was second lieutenant then, you performed in the same function and duty as you always had, but that you basically might have felt [more] responsible for a lot of people's well-being.

Bragg: Well, you do, because that's your job. The reason why Colonel Gench could have said, "Look, I don't care what you say, I think you guys should be segregated in that shower, because I'm responsible for the health and welfare and all that of my unit, and that's everybody in it." So short of hanging somebody, stuff like that, commanders have a lot of leeway in what they do, because they are responsible. And when it comes to having blacks and whites—fights are going to break out and stuff like that—he can always say, "Well, it's too bad, so we can't do it."

Heck, when we arrived at Sasebo, and again, right now we don't have any assignments, we're just there in the occupation, right away of course the men discover the Japanese cathouses. The fraternization started almost immediately, naturally. And of course, it wasn't a new phenomenon, by any means, just more of it. Well, it turned out that some of my men begin—came back talking about, "Get this, Lieutenant, Jim Crow being at the cathouse." Now, the guy's name literally was Jim Crow! [laughs] He was a white guy. What it was, was they had this cathouse, it's a house of prostitution.

Wilmot: Is a cathouse, is that a brothel?

Bragg: Yes. Okay, brothel. [laughs] Okay.

Wilmot: Why does that make you laugh?

Bragg: Well, it's a rather far cry from a cathouse.

Wilmot: Well, I don't know the difference, so you should tell me what you mean.

Bragg: No, I don't think there is, but I'm just saying that the language—

Wilmot: Oh.

Bragg: But brothel is right.

Wilmot: Is a cathouse like a nicer place?

Bragg: I don't really know. These are pretty—it's like assembly line, I think, from the way they described it. But the point is that there are a lot of white troops there and not too many black ones. The Japanese don't know from black or white at that point, they haven't been educated to be discriminatory. That took a while. So everybody, all the guys want to go to the same cathouse, and that led to a lot of fights because these crackers can't really see—I mean, "There's something wrong with this picture." So what the camp commander, the base commander did was to call in the commanders of

all the black troops, that included me, and laid down the law to us, that “There is a cathouse here for white guys, there's a cathouse there for black guys.” Ain’t gon’ be no pieces of paper that says that. There’ll be no paper trail, but that's what it was. And in the army, a verbal order is just as binding as one written, but of course you can't prove the verbal. You see what I’m getting at? So we were just called in and told that, and I was taking notes, and I remember the guy saying, “Yes, and I don't care what notes you take either, Lieutenant.” It was “Fuck You.” It was just that cold. The argument was, “Well, we don't want these troops fighting each other.” So [laughs] anyway, I don't know how that came up, but that was just the way things operated.

Wilmot: I have a question for you. So what did that mean for you in terms of having been giving that order, then how did you discharge that order to your men?

Bragg: How did I tell the men that?

Wilmot: Yes, would you just say it?

Bragg: There's only one thing to do, I said, “Look, I hate to tell you this, but it's not going to do any good to go there, all you're going to do is get beat up, and nobody will be able to protect you.” Well, they didn't like it. Of course, we were used to segregation, quite used to it, and so it didn't bother them, but not all were that way. Nevertheless, it was just a question of either they adjusted to that or you were out. So that was while we were still at Sasebo.

Later, we came to Fukuoka, which is a bigger town on Kyushu. And there we were attached to a general hospital, which is a big hospital. It's like a general hospital of a town, practically, in terms of the number of people, served that whole town. Again, we were the only black troops, now part of the hospital contingent, but again, attached to them. Being an officer, I’m in the officers’ quarters, naturally. So to deal with the delicate issue of integration in the officers’ quarters—being we were in something like two men per room, cubicle-like—they put me in with a chaplain! I guess the idea was, “He’s a man of God, he ought to be able to put up with this black guy.” [laughs] His name was Bunker, as I recall. I don't remember his first name, but he was from some little town in New England, who constantly complained about the hardships on him being in the army.

So that was the assignment that we had. There of course our role is quite obvious, it was what it was before, except now it's bigger. But the hospital commander, I don't remember what his name was, asked me to see about getting the uniforms of the officers clean. Up to now, they always had to shift for themselves. Our job was not to wash, not to do uniforms for officers. But he asked me to see what I could do about getting it done somehow. Well, I had an interpreter—how we got him I don't know—but a Japanese guy who was fairly fluent in English, lived there in the town, and took us around to interview Japanese laundries to find one that was big enough to handle the clothing of 200 officers.

That was quite an experience, because up to now about the only time I'm ever in a Japanese business situation—I hadn't been in any, but we've been in these sake houses where you drink sake and the girls would come around and pour you sake and whatnot. But we got to this laundry, and they have an office there. Nobody talks business to start

with. We sit down at this table, and of course we're all young, so it's no problem for us to sit down like that, like the Japanese. And they feed us, with the scented towels to clean our hands off and everything. And they cook this sukiyaki, which I had never had before. Beautiful, they must have gone to great expense to get the fresh meats and everything. The way it's done, of course, is they start cooking the meat, thin strips of beef, and then cook the vegetables, and they serve it hot, eggs and whatnot along with it. And you're drinking this sake at the same time. Well, after a while you get to be pretty loaded if you're not careful [laughs], and you're very susceptible or amenable to seeing that these guys are okay. [laughs] So I remember that, I've never had sukiyaki that tasted any better since. I've had it God knows how many times since, but it never tasted as good as that. Maybe it was the beautiful setting with the girls with the kimonos on. It was like you are royalty. Really put on the dog for us. And they got the contract, they got the job too. [laughs]

And having seen our quartermaster laundry operations, I was surprised to see them do one thing that I have never seen since, and I've never even seen any Japanese in this country do it. The way they would fold a sheet—this is not history, but interesting—so that even though they weren't pressing it, it came out almost pressed. And the idea is if you stretch it, after all, when you press the thing, you really just stretch it. If two persons would grab two ends of the sheet and pull it, and then fold it, and then stretch it again, and then one twists this way, and the other twists the other way, and that stretches it even further, and then they fold again. And after two or three times, the thing was almost like you pressed it. [laughs]

Great issues in the history of Robert H. Bragg! [laughs]

Wilmot: I think so. I have a couple of questions when you're done with that story.

Bragg: Well, that was all. I'm sure it got a nice pay for our interpreter, it gave us an introduction to the way Japanese do business, even in the crudest situations. The scented towels and all that, I just loved it. Taking off the shoes, loved the whole thing. So that's the end of that story. [laughs]

Wilmot: You mentioned when you were speaking about the cathouses earlier that the Japanese didn't really have an American understanding and practice of racism at that time, so they were just as welcoming or unwelcoming to white people as black people, and I wanted to ask you about that. You said, "Yet," you added the word "Yet" and I wondered, did you witness the shift in people's attitudes?

Bragg: Yes, very important, because at the beginning—and of course I'm reporting a lot of stuff that I got from the men, naturally, but stuff that I got too from talking with the interpreters and so on and Japanese, a few Japanese that I met. Initially the Japanese don't really have an opinion about black troops, and it turns out of course that the black guys don't see them as "gooks" at this time. We never did call them gooks, that comes later with Vietnam. But the black guys think of them as more like white people, and they're not rejected by them, they're not scorned by them, and so on. So they go out of their way to be nice to them. They may be prostitutes and all that, but they don't treat them with disrespect and so on. And that's why I think that the first impressions that they made were very good. They had good impressions, and the Japanese were favorably impressed with them, because the white soldiers very often were very arrogant and

treated them—not all of them, a lot of them married and so on, so—. But basically, we're dealing with a defeated enemy who is, you know, a “chink” and all that.

Well, over time power and money will tell the tale. It doesn't take you very long to see that the guys who are running things are not the black guys, they're the white guys, the guys with the biggest ranks, and the most money and all that, and the most favorable positions, and whatnot, they're white. Not only that, after a while you begin to pick up some of the language, a little pidgin Japanese. You got phrasebooks. And some guys learned quickly, and of course they are learning too, speaking pidgin English. So the white troops began to say that we were monkeys and we had tails. So that was kind of a notion that got to be fairly widespread, but of course I'm sure if you check you won't find any, but the notion that the black guys were really savages and had tails was very quickly promulgated.

Wilmot: Among the Japanese.

Bragg: Yes, the white soldiers did that. That happened everywhere though, everywhere—if the white guys and the black guys were after the same women, they got the knock from the white guys that they were savages or whatever. So that was the way it was. Did I answer that question?

Wilmot: You did. As I understand it you're describing a change in the attitude of the Japanese towards African American servicemen in response to one, watching the power dynamics that existed, and also, two, being kind of tutored by the white soldiers. Am I understanding that correctly?

Bragg: Yes, well, when they would have conversations, if this would come up, that's the way they described their attitudes and so forth toward black troops.

Wilmot: Right. Particularly if you were an African American serviceman, what was the extent of one's interaction with [civilians]? Like in the Philippines and in Japan, were you shopping and going to church, like what was your interaction with your host community above and beyond—

Bragg: In the Philippines, well, first of all in New Guinea, there was essentially none. As far as we were concerned, these guys—. See, we were Americans, and our image of natives is guys with bones through their nose, and we think of Africans as being not like us. That's the level of our sophistication back at that time. So these guys are just as black as black, they were aborigines, essentially Afroid. And so they are climbing trees, and in fact, we had guys from Florida who were used to palm trees, could climb those trees just like those New Guinea natives. There's a way with bare feet. You don't need anything but grab ahold of the trunk of the tree and sort of shimmy up that thing and get up there and throw down coconuts. And two or three guys from Florida could do that just like the natives. But the point is that we see them just like everybody else does. We don't have any interaction with them, they're not speaking English, except maybe we'd pay them to go and get some coconuts or something if we didn't have anybody around for that. That was about it.

But we get to the Philippines, now, the Philippines were English speaking. Not highly educated, but they're still English speaking. They had been there under Japanese rule

since Bataan and all of that. Interestingly enough, we were so taken in by the notion of the heroic guerrillas that when we landed there and we would meet these Filipino guys who would come around the camp or whatever, we saw them as guys with guns, out blowing up Japanese military installations and so on. And I'm sure that did happen, but their definition was a lot looser than ours, because just about every local community had some kind of an underground organization that might not have done very much, but in a sense they were united against the Japanese, so therefore they qualified as guerrillas. At first, we would give them a shirt off our back. If he said he was a guerrilla, you'd give him something. The interaction was that if you were around a town long enough, and I didn't go through this, but we moved two or three times during the time we were in the Philippines from Urdaneta to the north, and to another place. But if you are around long enough, you are not in the wilderness somewhere, people, they were around everywhere. Life's going on, they were still farming, you see horse-drawn taxis, not horses but carabaos, like an ox. A little two-wheeled cart, people get on it just like a taxi.

Wilmot: Carabao?

Bragg: Carabao, C-A-R-A-B-A-O, it's kind of an ox.

Wilmot: Carabao.

Bragg: Yes, in fact they used them for milk, the milk was rather chalky to make ice cream too.

But they sort of went along with their everyday life, to the extent that they could. We had stuff like soap that was hard to come by, or blankets, or lots of things that we had that they didn't have. So people struck up friendships, courtships. After a while we got to the point where even though we had our own laundry detachment, we'd have Filipino girls doing our own personal laundry [laughs] pressing our clothes even! The war is going on, we were dressing in pressed clothing!

I remember when we first arrived in that particular village to pitch the tents and things—the army tent is, as it's issued, is set up so that you've got a center pole and several peripheral poles and some ropes that tie this down. But in the tropics if you do that you'll burn up, it's so hot in there. So what you want to do is open the flaps up so the wind can go through. But that requires some more poles, and we didn't have those. But they have bamboo. Well, the bamboo doesn't just grow out there, somebody owns that bamboo. So the trick is then to go and find out the right way to do it. You could take it and nobody—they wouldn't, they couldn't stop us. But the proper thing to do is to ask for it.

So I remember the first time we did this. We went, we discovered where this grove of bamboo was, and who owned it, and we go by this house which is made of cane, and sitting up off the ground, one floor up, animals underneath. We are sitting there, and we have to have some tuba, which is a drink made from palm juice. It's like a palm wine. When it's first cut in the morning it's very sweet, [it would] almost remind you of—for some reason I think of cinnamon. But anyway, as the day goes on though it begins to ferment, and it gets stronger. [laughs] But anyway, the point is that you must sit down and talk and have a little tuba and discuss things, and then you would get around to the

point of, "Well, we'd like to cut down—we'd be glad to pay you." "Oh, no, not necessary." "But no, please."

And that's how I got my laundress, who then came by and did my shirts, my clothing until we moved.

And generally, the interaction was—we would be invited over for dinner. They took to us—well, I can only talk about us because I wasn't with the white guys. But our men kind of dug into the first community rather well. They would be invited out to dinner. And the joke was, one of them, "Well, what would you like to eat?" So this guy said, "Well, I would like to have some hot dog." Why, out of all the things he might have asked for he said hot dog—. So when he goes to dinner he's eating his food, he says, "This is good, what is it?" They say, "It's hot dog, hot dog, yes, you know, woof, woof!" So it's probably a lie, but they're not above eating animals—squirrels, you know, it's not really that different when you got right down to it, horses for example.

But the interaction with the Filipino population was very congenial. I'm sure as time went on if we stayed there long enough the tail thing would have become more prominent, even though the Filipinos are dark-skinned like us. Still, they understood power structure as well as we did. In Japan—

Wilmot: Can I ask you one question?

Bragg: Yes.

Wilmot: While still in the Philippines, where were the white servicemen located, how far away from your encampment?

Bragg: It's hard to say definitely except that usually where you are depends on the size of the unit and its function. Our location for example was—of course, we were there with white soldiers—first in the school grounds of this town where the hospital was set up. Later we moved to a bigger area which is out in a big rice paddy, big field, just because there was a lot of space there. Generally, troop concentrations would depend pretty much on what the function was. You could be sure though, if there was a muddy place and a dry place, we'd get the muddy one, that's just the way it was. [chuckles]

Wilmot: You were going to tell me about in Japan?

Bragg: In Japan, it didn't take too long for this invidious comparison to come up. Now, it didn't mean that the black soldiers weren't popular, because they were, for the simple reason that they were much kinder, tended to be much kinder, and fall in love with these—with the women. Many of them brought them home when they could, married them. And of course, they left a lot of black babies too, which creates a lot of personal problems for the girls back then. But the general reaction was that, the chances were that because of the social stratification, the black soldiers were more likely to wind up with working class girlfriends rather than middle class girlfriends. After all, the general level of education of a black soldier, general level was not all that high anyway. Individual guys, officers and so on might have made out differently. But they would be off the beaten path. Also, the fraternization was such that—. After all, the girls have to live there, and one of these days the soldiers are going to go. So they have got to worry

about how they are going to be accepted once the guys leave, and of course, I'm sure you're aware that reprisals—every place where ever there was an army of occupation—in France they would cut off the women's hair and stuff like that for fraternizing with the Germans after the Germans were driven out. And some sorts of censure was natural. It didn't mean that there never could be any social interaction.

For example, we had one psychologist on the hospital staff who just seemed to have Japanese chick after chick, and I guess it was because he was like dealing with social workers or something like that. His profession—he wasn't out there shooting people, he was a psychologist. So there is a stratum there, an element of society he could interact with that's perfectly natural and that has a civilian counterpart. But I'm not sure—we weren't hooked up to laundry people [laughs], so it never occurred to us. Basically I'm saying that there were people, because of their particular professions, who just happened to be soldiers at the same time, and they could hook up with Japanese of that professional orientation. But generally the class thing, people would gravitate towards the power and the money.

Wilmot: I have another question, which is that you mentioned briefly, you kind of touched on the delicacy with which—there was an issue of discrimination within the group of officers that you moved in, and you had to kind of delicately navigate that as an officer and as an African American officer.

Bragg: Yes. [chuckles]

Wilmot: I just wanted to learn a little more about that.

Bragg: Yes. I had, as a black officer with a white battalion, and as a second lieutenant I'm probably the lowest ranking officer in there, because I just got made second lieutenant, and they had probably come over already. They were probably at least first lieutenant. I'm the low man on the totem pole anyway.

When we get to where we have an encampment—being an officer when attached to the field hospital, that was one thing. There all the officers were all in the same big compound, it was a big office building they had taken over, put a hospital there. And some of the floors had been made over into officers' quarters. We were essentially put two to a room. I wound up with a Protestant chaplain who constantly complained about the hardship on him and his family, being in the military. Except for going to mess, I didn't have anything to do with them, because I'm out with the other black troops that I'd know in the area. I might go and have dinner with them or something like that. So my social life is not dependant on the white officers. It was a totally different social life.

Wilmot: So does that mean that because you moved in a different sphere, you never kind of came face to face with other people's issues?

Bragg: Well, let me get this right now. I went from Sasebo to Fukuoka to Kobe, to Yokohama, and then I guess over back home. But Sasebo, we were just there finding out what things were like. Fukuoka was a more permanent situation, and I think there was one other black outfit there that we had trained with back in the States. The other guy, he had become an officer, just like me. So we sort of hung out together. But we were not hanging out in the same bars or whatever as white guys; it would be different. When we

got to Kobe, which is a bigger town—it's a big base, Kobe, there's a big naval base there—we were now well into the occupation. People are being rotated back home because they are demobilizing the army. At the same time, other people are being set up to stay there, and semi-permanent camps are being built, Quonset huts. The areas that had been bombed out had been cleared off or put in these temporary structures, sort of dome-shaped. They called them Quonset huts. It's named after somebody, I guess. But basically, just think of a semicircle like that, and long, and you just have some pieces of iron or steel, metal, like that, that go like that, and then the lathes are put on that siding, it's very quick to put up. Engineers put them up in a day or so.

Wilmot: Like a donut?

Bragg: No, it's more like if you take a sausage and whack it in half longways, that's about the way it would look.

Wilmot: Okay.

Bragg: And they're easy to install. They'd make the foundation, and once that is down they'd go up in almost a day or something like that, you could put them up. And they're nice and warm and everything, and you put in facilities, lights and all that. So that was where the men were being quartered.

But the officers were not. Our men were in a compound which had all black troops in it—my men, I'm saying. There were other parts of town, where there were the white troops. But the officers, the black officers were in this one club, which had once been a nightclub, it was called the Butterfly Club. Why, it's almost like somebody did that with tongue in cheek, because it had been a nightclub. We had rooms in this place, and they were our quarters. So this was our home.

The white officers of the same rank, more or less equivalent ranks, were in another place. So there again, the interaction with white officers was only when we came on duty, not when we went off. "You black guys, we don't care what you do down there." There is a captain and guys who have got the rank to keep order around there, whatever, but basically nobody came down there to mess with us, and none of us went over there to see what they were doing. So that was just the way it was arranged then. I don't know, other outfits might have had different experiences, but in my case there was a quartermaster battalion. That's only a small part of a whole big base though, it was a huge base, we were just a small, maybe a small fraction of the total number of troops there. Did I answer that question?

Wilmot: My question was more like, as perhaps the only African American officer, how did—?

Bragg: Oh, wait a minute. When we joined this quartermaster battalion, I wasn't the only black officer. We had trucking companies—see, it's a quartermaster battalion—we had refrigeration trucking companies, practically all of these are manned by—these particular ones are manned by black troops. Often commanded by whites, but not always. Some of them were black officers. So my first contact with a lot of black officers was when I got to Kobe. Up to that time, I was it in—no, Fukuoka, there was another black outfit there. Now, spread around in different places there might have been little pockets, but we were not close enough that we interacted.

Wilmot: Okay. I had made, in my mind, I had just jumped and decided you were the only African American officer, so—

Bragg: No, no.

Wilmot: I had asked this question a little earlier and then I interrupted myself to ask you another question, I was wondering about what was a typical day like for you?

Bragg: Well, it's like going to the office, except that the office is a barracks. It's called an orderly room, I'm not sure why it's called that, but it's called an orderly room, where your clerk is. Just about all of the stuff that is going to take place—I have an office, people are coming to me who have got some kind of assignments, they have got jobs to do. It's like going to see your boss, they'd come and see me. Whatever it was, we would either—well, I would have to discuss it, deal with it. A typical thing might be, well, this guy has got a section, and there is a problem involving the motor generator set. So if he can't fix it right away, he'll come to me. Now, it's not up to me to fix it, but it's up to me to fix the problem. So I might say, "Well, look, go over to ordnance and tell them to—take this, get on the phone and call ordnance to do this." So I have to know enough about the whole operation to be able to get problems and solutions set in motion.

But most of them are personnel problems, people problems. This guy won't get up, or this guy is insolent, this guy wants to go to the hospital, this guy is a malingerer, and he is goofing off, and is trying to get out on a medical but we know he is b.s.'ing. So you mostly are dealing with problems of people or organizations. "We can't get—we've been doing it this way, but it turns out that we don't have enough men to do it that way." Now, here's where your organizational skills come in. "Well, look, Sergeant Smith, Sergeant Jones, why don't we do it this way?" So that's where your leadership skills come in. But mainly it's people problems. Technical ones, there is somebody to do that one. But to do the other stuff is what you are really there for.

And I enjoyed that part of it. Solving problems is basically what I do. So to be able to get things done, and expeditiously with people who aren't supposed to be quite up to it, now that's a real challenge.

Wilmot: Problem solving I think also is just a very—it's a good talent, and a good skill to have.

Bragg: To get people to perform above expectations, that's the critical achievement.

Wilmot: How do you do that?

Bragg: I don't know. But that's what I have usually been able to do, to get people—well, a good coach does that, though. It's like a coach. To get people to play over their heads, in other words. Now, their head was probably there all along, they just never did play up there. [laughs] Because I don't think you can make them geniuses. But most people can do better than they do. So to get that last ounce out of them is where the challenge of leadership is.

I enjoyed the problem solving. The conflicts I didn't like, that I didn't like. But solving problems, I really liked that.

Wilmot: I'm wondering who were your superiors? Or who was your superior who you answered to most of the time?

Bragg: Mostly it was somebody that just happened to be a part of the organizational structure. The only guys I remember well are Colonel Gench, as I mentioned, because he is the guy I gave the lecture on democracy to.

I remember one other guy, because I don't remember his name, but I remember he was such a bastard. He was a West Point graduate who never got over it, the sort of guy who would tell you about—he would regale us. He was an infantry officer somehow being punished by sent to command this quartermaster battalion. So you can imagine, it's a comedown for him. He thinks he is superior to all of us, and he can't wait to tell us some anecdote about happened at West Point, fifty years ago or whatever.

I remember one time he is telling us about standing in a formation on the plains of West Point, and this airplane dives at this formation, and if it hadn't been that the guy changed his course, he would have been dead. He was proud of that, he stood there at attention, wouldn't move. We would think, well, [laughs] what fool would stand there? It looks like you're going to get killed, you're supposed to run! So, anyway, I don't remember that guy's name, but I remember that incident. He was a misfit.

Wilmot: In general it sounds like you didn't have a commanding officer over you with whom you developed a strong working relationship?

Bragg: No.

Wilmot: And were they very just transitory?

Bragg: Well, you knew your job, and basically we were—the battalion consists of disparate functions. We were laundry; there were quartermaster trucking companies, refrigeration trucking companies, and other things like that. Each one has its own kinds of function, and each one has its own officers. Now, we are there to provide this kind of service, support, to the base, so that we are reporting to a guy who is above us, he is a major, typically a major or a lieutenant colonel. But other than that, we don't have a lot of truck with him. Besides, we're black and he's white. I'm sure the white officers probably did have interaction. But as far as I can recall, the issue just never did come up.

Wilmot: Yes, I was trying to determine not so much the rank system, but to whom you were responsible.

Bragg: Oh, that problem was there now. Everybody wanted to be promoted, and if you were second lieutenant, you wanted, you expected to make captain before it was done. That wasn't very ambitious. I mean, that was more or less standard. Just like once you're on the ladder, you get in a ladder rank position, you are expected to march through from assistant to associate to full, and so on. Just do your job, write your papers and everything, and teach courses, and in due time, you don't have to be a genius, whether it's Berkeley or—it doesn't matter where it is. So in the normal course of things you expect to make progress.

Well, if you came into the army early, you would be in a rank long enough for this thing to play out. But if you came in toward the end or if they are already beginning to demobilize, the natural growth that goes with the situation isn't going to pay in your favor. So for me it made no sense to worry about whether or not I was going to be a first lieutenant. I didn't want to be one anyway! It didn't make any sense to be a sergeant if I'm going to be reporting to a lieutenant who doesn't know his job, and I've got to teach him and he's going to get all the credit! So it didn't make any sense not to do that. But having done that, it didn't make any sense for me to worry about impressing a colonel about it so he could get me a promotion. I don't want to stay in the army anyway.

Wilmot: You weren't looking for a career in the army.

Bragg: Hell no! [laughs]

Wilmot: Tell me why?

Bragg: Washing clothes didn't hold any attraction to me, and driving trucks didn't either. I might have been different had I been in the engineer corps, for example. Although, I doubt it. Signal, I might have, I probably would have liked that, or certainly been very amenable to that.

As a matter of fact, when I finally came out—this is jumping ahead, but it speaks to the point—when I was demobilized, or, you know, discharged, as part of the discharge procedure is you are encouraged to join the reserves. And that makes sense, you already know how to soldier, and in times of need you could be called back up and you already have your rank; you don't have to go through that again. In fact, they even have programs whereby you can achieve higher ranks. A lot of guys did that.

In my case, I didn't have any particular desire for a career, but I didn't see any point in having to go through that again if I came back up, so it made sense, it seems to me, at that point to join the reserves, which I did. Well, it turns out that not too long after that the Korean War came up. And now they want me to—I had been assigned to a trucking company. Understand, now, I've gone back to school in engineering, and they've put me in a trucking company. Just put me somewhere. I didn't attend any meetings or anything, but that was my assignment, the way the records showed. Well, when the Korean War broke out, they began to call people back. In fact, my brother was actually called back. He was in the navy. I remember, some headquarters wrote me a letter saying, "Soliciting interest in the military," and preparing for advanced training. So one of the things you could have done was to go to guided missile school, which was about a six month thing. That sounded technical to me. So, well, if I have to go back I want to do something that's more technical than washing clothes. So I remember I wrote back, "I'd be glad to do that if I go to guided missile school." Maybe it had to do with whether I would sign up again. I never got an answer except this: "Directed to Candidate's File." Didn't say anything, but up in the upper-right-hand corner was in pencil "COL." In other words they're not going to send this black guy to guided missile school.

Wilmot: COL, what does that mean?

Bragg: Colored!

Wilmot: Okay.

Bragg: Didn't say a thing, didn't say no, yes, just "Send it to his file." Well, you can imagine how eager I am to re-enlist in the army. If that's what they see when I tell them what I'm doing, I'm in school, and right now I'm studying physics. So they want me in a trucking company?! That's not my idea of how I should serve my country. So no, I wouldn't do it.

Wilmot: Okay, so we're going to close for today, July 1st, with Professor Robert H. Bragg, Interview number four.

Interview 5: July 3, 2002

Wilmot: July 3, Robert Henry Bragg, interview five. We're talking about World War II. I noticed on your outline you have a mention of "social consciousness, artists and writers" and I wanted to ask you about that.

Bragg: Yes, that had to do with the people that I—I guess the slang term would be hung out with, during that period. I'm not sure exactly how it got hooked up, but during that period the people that I saw socially, and I'm talking about back home, before I even went into active duty, because that was another whole game—but the period from community college until I went into active duty, and to some extent a little while afterwards, because we didn't lose contact, were people that I had met probably through Henry Blakely, who was a classmate of mine at Tilden High School. Henry was an aspiring writer who married a woman who really was a successful writer, Gwendolyn Brooks. They were already married when we got out of junior college. So they had a house, and she was a person who loved to entertain, I think often to gain material for her writing. She would sit back and let you, everybody, rap and talk, and the people we were talking about were the people they had met through poetry groups, or something like writers' groups. There were some around the Southside Arts Center. I never did hang out there, but I knew them. I was kind of rare because I was interested in science, and could talk that and had some interest in writing, rather literature, but certainly wasn't pretending to be a writer.

Wilmot: Did you ever feel like you were able to bring the poetry of science into the circle?

Bragg: No. I didn't understand science that well then.

Wilmot: To make it poetic for them.

Bragg: That's possible, I think, but I couldn't have done it then.

But the point is that I understood them. The talk was exhilarating, even when it was pure bullshit, it was still—the play of words and whatnot, I enjoyed that atmosphere. Many of them were kind of oddballs in one way or another, but that was all right, that never bothered me at all. But along the way, because of the war effort, there was a sort of a politicization, politicizing of art that happened pretty much all over, I think. Not to be somehow concerned with the war effort was seen to be frivolous. So even though you might not like to be dealing with war issues, that permeates everything during the war. Everything is reduced to winning the war, or fighting the war. So it's hard not to have some political attitudes and developing a political consciousness. Otherwise you're just sort of a cipher, to be in the midst of this big earthshaking event, and not have any consciousness of it is not to be aware, it seems. So certainly that is the way I would see it.

Not too surprisingly, most of these people were—well, they were certainly all liberals, and all leftists. Let's back up, not necessarily all leftists, but certainly that would be the more likely attitude. It would be hard to find a Republican in that group, for example, a current Republican. And I enjoyed these people. I thought the conversations were great. A lot of the girls were live wires, I could talk to them without having to chit-chat.

I never was very good at talking trash, small talk, outrageous things that you know are not true, but people eat them up. So I didn't have to do that in that environment, and I enjoyed that. So that's what I meant by it.

And of course, along with this comes the participation of intellectuals in supporting the war effort, putting on shows, things for raising money, bond rallies and all that. I remember going to bond rallies where Paul Robeson sang, for example, and had never seen him in concert before then. Others where Russian snipers had been brought over to—Pavelichanko had killed two hundred German soldiers. That was sort of the thing that went on during that—that was where you had a direct outlet, a display of your support of the war effort, through these particular activities.

Also, the philosophical question is, “Why should black people be in the war in the first place?” So you either say, “Well, it's not my war, they're not fighting for me,” and you could make a very good point for that. Or you could say, “Well, they're not, but this is our home, and we don't have to excuse it for its infirmities or its inequities. But we'd rather win this and take our chances here, than have the country lose the war and we would probably be worse off, because they (the Germans) don't like us either.” And so that is what I meant about developing the social consciousness. And that's the way I took the point of view that I'd rather fight for us than them.

Wilmot: And that was before you went away to fight in the military?

Bragg: Yes, right. And, well, it never occurred to me to be a conscientious objector, for example, which would be one way that you might participate without being obliged to kill somebody. But I didn't—well, it just never occurred to me to go that route.

Most of those people turned out to—let me put it this way, they are probably all dead by now. Some of them remained friends for the rest—a few—until now, who were still alive.

One was the founder of the Du Sable Museum of African American History and Culture in Chicago, Margaret Burroughs. Well, Margaret was one of them, and probably one of the most vocal because she was a big promoter of art, taught art in the Du Sable High School. And always ran a kind of—I'm not sure salon is the right word, but always had an apartment where you could just sort of drop in. Artists who were kind of down on their luck one way or the other could always find a place to store some paintings or a piece of sculpture they had worked on. And generally you were welcome. She was no frills. Margaret pioneered the natural, which meant that she got tired of going to the beauty parlor and getting the kinks out of her hair and just stopped doing it. Luckily her head wasn't badly shaped, so she could get away with it. [laughs] A fairly good physical specimen; she had been an athlete in high school. Margaret's in her early nineties, I think, now, or close to ninety, but still going strong.

Wilmot: Are you still in communication with her?

Bragg: Rarely, but we're still friends. Margaret is very tight, so the last time I wrote her I said, “You asked me for money for your causes, and I want some money for this cause.” [laughs] She never answered it, so—. I don't think that's got a thing to do with it, but she is kind of tight with money.

Wilmot: Well, I think sometimes it's hard to reach out to people and say, "Okay, put some money into my cause, and vice versa." Like, sometimes people aren't fluent in that language. But, in any event, what kind of causes were you—?

Bragg: [laughs] Oh, in my cases it always had something to do with science or engineering.

This is off the schedule, but what comes to mind is in Oakland here, this area, there is a group called the Northern California Council of Black Professional Engineers, of which I am a founding member. Now, I'm not an engineer, and I'm not a professional engineer—that's a special designation, there's a license that goes with it. But there are more black engineers around than there are black scientists. So back around 1970, when the whole consciousness of blackness and—what do you call that?—linking up people came up, these black groups were being formed. The one that got formed around here was a black group of engineers. And the more senior guys, who had been coming out of the service and so on, hadn't had the opportunity to work as employees in white firms, and for the most part had to become self-employed. To do that you need an engineer's license. So therefore you became a professional engineer. Typically they would be mechanical engineers, civil engineers, electrical engineers, practically all of them had to go through that, or go work for the federal government. Very few found employment say at Bechtel or someplace like that, during that period.

Well, they were the more experienced ones. There were only a very few coming out of college with no experience. So when the thing was set up, they set up a caste system, meaning that in order to hold office and so forth you had to be a professional engineer. Well, for me it made no difference. I didn't want to be an officer anyway. I thought we ought to have such a group, but I had no political aspirations, it wasn't going to be a feather in my cap, so it didn't bother me to have that class distinction. And it stood for years. Finally it was knocked down maybe ten years ago, but for a long time it stood there.

At any rate, I've always been a member, since 1970, whether I did anything or not, always paid my dues and always kept up with it. And often would serve as a committee member, but I didn't want any offices. Well, recently a young woman who has been a sparkplug in keeping the thing going, along with others, got the idea of having a museum sort of like the African American culture thing, that you find in places around the country, but devoted to science and technology. So that program got set in motion two or three years ago. It's the Maat Science and Museum—I forget the full name, but basically the Maat has a connection to African attitudes toward science and its relation to the world and all of that. But basically behind it is the idea of having a museum that deals with blacks and science and engineering, to do things like the Lawrence Hall of Science, to have classes that people could come, exhibits to be seen, promoting events like Earth Day and all that kind of stuff. So anyway, you have to raise money for that. I put mine in, and hit up my friends. I thought, well, normally, every time I look around I get a flyer from—it used to be from Margaret with her own signature. But once the thing got big, why, somebody else did that. I said, "Well, but now, look, Margaret ought to give us some money." [laughs] She never did. I don't hold it against her. It may be that she forgot or whatever.

That's a digression. We got onto this because of the culture thing.

Wilmot: Yes. Every time we talk, you raise like whole universes of things we could spend a lot of time on.

Bragg: [laughs]

Wilmot: I think it's really important for us to talk about—as we've said, you are a lifetime member of the NAACP. It's really important for us to talk about what your commitments have been and continue to be, so we'll spend time there. Well, actually, now that you've raised the whole arts and arts in consciousness in the environment, the social environment that you were kind of frequenting while you were in junior college and after you left high school, or community college, after you left high school, I really want to spend some time with that. That's my long-winded way of saying that.

Bragg: Okay, fine.

Wilmot: So, these dinners you've described, can you tell me a little bit more about the atmosphere of these events?

Bragg: Well, the social situations would either be events, like a fundraiser, or just a party, which would be expected to have maybe some liquor or coffee or whatever. Very few people had sit-downs. Houses weren't big enough in the first place. But you'd go over to Margaret's house or go over to Gwendolyn's house, Henry and Gwendolyn, and there would be other people there like yourself. They are trying to write. Most of them had been in writer's groups, or they were sculptors, or painters, and sometimes both. I would be sort of, maybe kind of the odd man out, but I enjoyed being around them and could talk the lingo to some extent.

Wilmot: Was Elizabeth Catlett in that scene?

Bragg: No, that would be in New York.

The people who came through, for example Richard Wright—I never met him—but I remember lots of the arguments that went around with some people taking the point of view that, “My God, why does he have to write about black people killing somebody.” Acknowledging that he could write, but why write about that, and so on. There was lots of hullabaloo about that. People like Era Bell Thompson, who eventually wrote some books about black life in Nebraska, Margaret Walker, who wrote a powerful poem that I used to have memorized because it was so good. A book of poems, it appeared, *For My People*—one of the few books of poems that I ever bought and had it for years, I loaned to someone, it's gone. But anyway, Margaret Walker I think—. I'm trying to think of the name of the anthropologist who had a rather tragic [Zora Neale Hurston]—we'll come to it later. But people like that would be coming through or were around. And I'm like the young outsider who is congenial and all that, and doesn't have much to say, but was just fascinated by the whole thing.

There were other people, like I remember Joe [Johnson]—I forget his last name, who had made an enormous collection of articles about lynching. He was planning to write a book on it, and never did. I think Aptheker eventually did.

But these were the people that I would hang out with, and I thoroughly enjoyed being around them.

Wilmot: There are two things I wanted to talk to you about that are actually right here all around us in your apartment. The first thing was actually that book that you have, *Without Sanctuary*?

Bragg: Oh, yes. That was given to me by my nephew, who thought that would enlighten me. But of course, he was enlightened, but I wasn't.

It's full of articles and very graphic photographs of the whole phenomenon of lynching in America, which went on up until practically World War II. There were some afterwards, the frequency was dying off. But certainly as late as the late thirties, lynchings were still going on, and they were public events like the circus. In fact, come to think of it, of course that wasn't exactly a lynching but it wasn't too different, even after I got out of college—I was working in my first job and living in Glencoe—the Emmett Till case occurred, which involved a young black teenager going down to Mississippi to visit his grandparents on school vacation, a school holiday, I guess. The rest of it isn't too clear except that he was killed. Apparently some white woman in a store, like a grocery, made a remark that he had whistled at her, or some familiar kind of thing that didn't happen between white people and black people anyway, and certainly not black men and white women. Although he wasn't even a man, he was still a boy. But the result of that is he was taken out and lynched and killed and hidden in a swamp some place. He eventually was found, but—. That became a famous case, a real circus atmosphere.

I remember we had a rally, a NAACP meeting at the local church then, where I was living. A young woman who had been a reporter for the *Pittsburgh Courier*, a young black woman, a rather light complexion, had gone down there to report on this event. And she said one of the white people talking to her complained about the press being critical of them. She said, "Well, you know, we have to kill us some niggers some time." As if they were being imposed upon by being criticized. [laughs] I know you can't believe this is true, but that was the attitude, that well, they needed to—"After all, every so often you have to kill some niggers." "Keep them in their place." And very important not to do it silently, do it openly so that there's a guy, head on a post up there, or left hanging, "strange fruit."

Wilmot: It's interesting that your nephew thought that you might be learning by looking at this book when in fact as you've described to me earlier, you've grown up kind of listening—that there was just a lot of violence of that nature that was in the newspapers.

Bragg: It wasn't news to me at all. Now I'm not sure exactly what he thought, but he thought I would find it interesting. Having been shielded from that, and not brought up to dwell on it, he was being informed naturally, so he thought, "Well, maybe Uncle Pete will find this informative, interesting." Of course I went through it, but I didn't find anything that was really new to me. A particular hanging I might not have known about, but the general phenomenon, there was no new revelations in it for me.

Wilmot: The second thing I wanted to ask you about, and this is different, but related to when we were talking about art. I look around your apartment, and I just see many different

pieces of art, many different pieces of art. I see some from Africa, and I see some from Japan.

Bragg: Mostly Africa and Japan.

Wilmot: Especially now that I know that you had close proximity to this arts movement in Chicago, I'm wondering about what is important to you now about having art in your house?

Bragg: I don't pretend to have any deep insights into art, first of all, so I'm not suggesting that I'm a collector. I am not.

Wilmot: No, I'm suggesting.

Bragg: [laughs] Well, but I'm not. But if you go somewhere, there are things about the culture that you want to have a look at. I want to go see where the people work, for one thing. So that's one aspect of the culture that—you know, if I go somewhere, for example, you go to Hawaii and all you're going to see is people out there on surf boards. Frankly, that doesn't do a damn thing for me. I'm not sure it ever would have been totally satisfactory. My idea was, well, what was the big deal? Sugar. So I had to go see what the sugar mill looked like. Now, the number of people who did the sugar mill tour was very small. A lot of people there out on the beach getting their tans or whatever, swimming or whatever. But that was okay, I mean, nothing wrong with that. But I'm just as curious, and more so about how people live, or why they were the way they were and so on. So to collect cultural artifacts, either about activities, or things like their art, how they saw things, that would be of interest to me. So I would buy little mementos. I'm not going to make a big investment in art. You won't see any pieces that cost thousands of dollars around, or even dollars, even tens of dollars. But touristy kinds of carvings and stuff that you will see around, that's what that is.

[looking at a painting on his wall] Well, that's different. That's Charles White, who was a rather successful black painter, artist. I forget what the name of it is, but it's the famous one out of all of his work, that is probably one of the best known.

Wilmot: Two women standing in what looks like a farm in the country.

Bragg: Somewhere, it's rural, somewhere.

Wilmot: Yes, looking away and maybe talking to each other.

Bragg: But some of this stuff is just crap. For example, that sword you see hanging there on the wall, I got that in Jamaica. Now, the reason it's crap is not that Jamaicans aren't good artists, but they make these things to sell cheaply. [laughs] That one there. And the shield, on the other side of that hat there also, it's a very—they probably carved that thing in a matter of a half an hour or so.

Wilmot: What about that piece over there above your sofa?

Bragg: Oh, that huge painting and frame.

Wilmot: Yes.

Bragg: That's a very current one from right here in Berkeley. Actually, the artist is Mary [Lovelace] O'Neil, who is on the art faculty at Berkeley, who is an abstract expressionist, I guess it is. Not impressionist, expressionist. I'm not sure what the difference is, but I was told to be very careful, that one is not the other. [laughs] Mary was—one of my offices, one of the duties I had at one time was I was the faculty assistant for academic affirmative action. In that role, I was sort of the conscience of the chancellor about inequities that might be perpetrated, that first of all would be wrong, but even more importantly, might bring grief on the chancellor. So basically I covered his ass.

Wilmot: Was that chancellor—?

Bragg: Mike Heyman?

Wilmot: Mike Heyman.

Bragg: Well, the office was originally set up to report directly to him by Ollie Wilson, I think it was. He was a music professor. But eventually it got pushed down to where by the time I got there, I reported to the vice chancellor, who was Rod Park. But the impact was the same. Cases involving promotion, hiring, improvement, whatnot, and support—because of the fact that minority faculty very often got lost in the shuffle by virtue of indifferent support from the department chairs and so on—had an additional source that helped to balance, helped to level the playing field. So in that office you, with respect to things like promotions, any personnel action that involved the hiring or upgrading or disciplinary, for that matter, eventually had to be signed off somewhere up there, around the provost or the chancellor. But along the way it came through my office. In fact, setting up the rules whereby departments had to function, originated in that office, with the assistance of the lawyer, the campus attorney.

But when it came to minority faculty where you needed money maybe to go off to a meeting that you didn't have any money for, didn't have a grant, I had budgets to fund some of that sort of thing. And also, many of the minority faculty coming in have not a clue about how the game is played. I'm being a little bit facetious there, but basically how the university really operates. Now, it may be in the faculty handbook, but I didn't get mine until I became the department chairman. "There is one." But nobody saw fit to give me one, and I didn't know to ask for it. So I didn't realize there was a faculty handbook until I became the department chairman. But the job I'm talking about came after I had done that stint as chairman. But the point is that encouraging people to play, to follow the rules, because those are the rules that are going to be invoked when the time comes to either promote you or whatever.

One of those is that—the unofficial rule, unwritten rule, is—don't be happy just because you got hired, or just because you made tenure, because you have just come in on the bottom rung, and with normal progression, you should expect to go all the way to the top. You don't have to be a genius, but you do have to be productive. And you shouldn't waste your time doing things that are not going to contribute to that. One of those, of course, is to spend too much time being the mama and the papa for every student who comes looking for you to go fight a battle for them. I'm not suggesting that

you shouldn't help. But you do have to avoid getting boiled down in jobs that are somebody else's job. There are other places for that.

It just happens that in her case, Mary was not getting the kinds of shows she needed. One of the ways you evaluate artists is whether they have exhibitions, whether they have shows. So to help her in that, she would come to the office. By now she knew about this office and its function, and it had a little money, so I got to know her very well, and so she gave me this painting. I'm not sure what it is, I'm not sure. I think it has got something to do with whales or something like that. But she had some fairly colorful titles for some of these things which [laughs and claps his hands] I won't bother you with.

Wilmot: Okay.

Bragg: I've finished my point.

Wilmot: I understand, I was just kind of digesting it. You told this very interesting story about that job that you took as faculty assistant. I was aware that you had done that under Mike Heyman, so we need to spend a lot more time on that, actually. Especially as you really brought up the idea of the formal rules that people must follow, and then the informal rules that also exist.

Bragg: Very important. There's a law for everything, and of course there are always exceptions, but I don't care what you do, if you're supposed—if the criteria are you should be doing this, that, that, and that, and you don't do that, you shouldn't argue that my criterion is more important than yours. Because you are one and they are many. [laughs] You can do anything once you have gotten your bones, made your bones, then you can be creative, and abstract, and go off and do anything—now you're legitimate. But you don't start out saying, "The system is illegitimate, and I've got the key to the kingdom." That's as simple as that.

Wilmot: Well, shall we return to World War II?

Bragg: The only military experience that I think I haven't touched on had to do with a murder case. We were in Kobe, and—you were right. Kyushu, Sasebo was in Kyushu. There's another island in between, and then Kobe. Or rather Honshu, Kobe is on Honshu, that's where I spent most of the occupation. In this camp that the quartermaster battalion was located—it was very military—it was sort of immersed in an area that was surrounded—not too far away there were like slums—some of them were off limits. In other words, there were sake joints, and essentially the kind of things where there is a lot of liquor and prostitution and gambling and all that, and the people there are not too disposed to want American soldiers around anyway. And American soldiers think they just won the war, so they feel like they can pretty much dog it over Japanese civilians. And that leads to all kinds of problems.

So these areas tend to be offlimits. The MPs, these are military police, more or less tried to prevent soldiers from going to those areas, or if they catch them there they would roust them out. Well, I had personally no experience with these areas. But, the enlisted men knew about them, and very often they would go anyway. This particular time, a military police came to my billet—where I lived, my quarters—late at night, to

come down to the police station. One of the men who was in my detachment had been arrested in connection with a murder. Well, I went down. It turned out that he couldn't be released because it was a murder charge. The niceties of the situation were that the Japanese, the military had to have the authority over the Japanese—the American personnel. They, Japanese were not at that time permitted to punish you. They could arrest you, detain you, but you had to be turned over to our security people, military police.

Well, it turned out that these the two men were accused of killing a Korean guy in an offlimits area. As the story unfolded, apparently they went to this little sake bar that he had, a little bar with a few seats, and not unusual for that area, and drank some sake and refused to pay. The owner, when they didn't pay up, he wants to collect his money, or else. Well, one of them struck this guy and ran out. He runs on after them. It seems that they ran into an area which was dark, and he did too. There were no witnesses that actually saw what happened after that, but when people arrived they found his throat was cut, and he died.

I guess someone must have seen these soldiers running around there, because they knew enough about our quarters, actually, to come and pick them out. That had happened before I was notified. Well, a few days later a guy shows up to my orderly room from the CID—this is Criminal Investigation Division; it's like the murder detail; also they did things like smuggling, all kinds of investigatory stuff like that—presents me with a narrative that says this is going to be the basis of charges brought against these soldiers who are in my unit. Now, it turns out that the military has a requirement of the commander that it's his job at whatever level the person happens to be, to bring the charges. In other words, the police could not act on a charge from somebody else, it was my job to bring these charges.

I read this statement, and about the only evidence that they had that I could see that was clear was a piece of rock, or actually like a piece of brick, it was kind of sharp, and one could imagine that if you—[motions a cutting motion]—you might be able to cut somebody, but I couldn't see that that was good evidence. If they had shown me a knife, now that would have been more like it. But it wasn't that, it looked to me pretty flimsy. Not only that, the case hit the base newspaper, and it was treated very much like stories would have been treated down South at that time. "Some black people—" It was almost—it was derogatory. That whole tone was derogatory. As if, "Here we go, these niggers have come over and are killing people." I didn't like that. There was not much I could do about it, but it struck me as being an overreaction.

And going further, the guy who ran out after these men was a Korean, he wasn't Japanese. And you have to understand that at that time the Koreans were kind of second-class citizens in Japan, probably still are, and certainly they were then. So he was hardly—. He was in an off-limits area, kind of a slums. And a Japanese would not have done that. He wouldn't have taken the same response to being cheated. At least I didn't think he would have, that was the way we saw the response to different indignities, you might say. Not only that, but somebody else might have killed him. After all, he is in an off-limits area; he is in a slum area; they don't like Koreans that much anyway.

Now, it may very well be that the guys did kill him. But they didn't kill him with the weapon that was produced, in my opinion. And I refused to press charges. The battalion commander said, "Bragg, it's your duty to press charges." I said, "Yes, but I can't believe that evidence. All it looks like is that they did try to cheat him. So I'll do that." And I never did. And my parting evaluation was like an F. In other words, my efficiency rating was based on that. I don't remember if there was a narrative. You get ratings from time to time, reviews of how well you've done, as a basis for promotion or whatever. So I didn't come off looking like a great officer, but it never bothered me because I didn't want to be an officer anyway. Now, besides, I just didn't like the way it was done; I didn't think the evidence was that convincing; and I didn't see where—there had to be another way to bring charges. I don't know if the men ever served any time, I don't know what happened to it, and I never really did go back to try to find out. But my feeling about it was that it was like discrimination all over again, they were doing it in the army, and I didn't like it.

I had one other experience dealing with disciplinary stuff, where two groups of soldiers got into a fight, and a Japanese woman was shot accidentally. We are now demobilizing, and units are coming over that are new, they had just finished up basic training. A lot of these kids are young, they are eighteen years old, just out of high school, if that. And just the first time away from home, and they're in Japan now, and they can sell blankets on the blanket market and get money and buy liquor and buy women and all that, so they kind of go wild. Well, it turned out that some guys had first come to Osaka, which is the next town to Kobe, and they had spent some time there in Osaka. There was a cathouse there that these guys used to hang out at, that was more or less their cathouse. They now get assigned to my unit in Kobe. But since they just left, it's maybe thirty minutes away if that, they can easily take a truck and go back over there. So rather than dig in to the new location, they want to go back over where they used to be. In the meantime, another unit moves in there, and they take over the cathouse, it's theirs now. Now we have two units vying for the same cathouse.

Well, this one kid I remember interviewing, whose nickname was Tin Can (they had very colorful names like Bogart). Tin Can was a nice young fellow. I went to interview him in jail. "Tell me what happened." He said, "Well, we got over there early and I had been drinking some sake and must have fallen asleep. So, when I woke up there were some guys on this side of this room, all that, and our guys on side, and they are woofing at each other, threatening." He said, "My father had told me if there is going to be a fight, you should get in your lick first." So he says he punched the guy closest to him, [laughs] and that set off the fight. In the melee, a Japanese—I don't think she was killed, but she got shot. I don't remember what happened with that, but I remember distinctly here is an innocent guy, he just happened to be there, but he is the guy that set the fight off. [chuckles]

Well, there are a lot more details of various kinds, but basically the occupation was one of, if I characterized it, it would be it's a very turbulent situation where lots of units are demobilizing, and whereas beforehand you might have been staffed by experienced noncoms and officers at every level, now people are going home, because depending on the length of service you could be mobilized out or discharged from the service. So you are constantly dealing with less and less efficient organizations. Nobody knows their job. Guys who used to be corporals or sergeants get moved up, but now they don't really know that job that well. So you are constantly fighting deteriorating efficiency.

It's harder than—you can't really train anybody, because quick as you do, they're gone. So that was the bad part.

The black market operations, which I didn't get involved in personally—but there was a lot of that that went on, pilfering of government property, things that people, civilians really needed. Soap, blankets, food. Japan was practically in ruins. So it was a very big black market going on, and you had to watch out for stuff being pilfered from your units. After all, you are a custodian of government property, and you have to watch out for that. Basically, that's the way it went until the time came to go.

Wilmot: So how did that occur, how did you leave the army, and head on home?

Bragg: Oh, well, I left the army because at a certain time my points for eligibility to be discharged grew high enough that they send you home; they detail you to go home. That eventually happened. Meantime, I'm going from one kind of unit to another. I had started out with a quartermaster laundry detachment, I wound up with one platoon that was part of a quartermaster laundry company. I think for a time I might have been even a company commander. We were constantly changing personnel to staff these, at least minimally staff these units. I wound up in charge of a refrigeration trucking company, vans that haul food from ships to interior ports. And also I think one time I got sent from Kobe to Nagoya and then back. Hopping around, it was a very chaotic situation.

But meanwhile you're keeping track of your time, [laughs] and finally when the time came I was detailed to go to a replacement depot in Yokohama where you wait until enough people accumulate to put on a ship and send back home. I was there—it's interesting, I ran into an old friend from Chicago who was working for the Red Cross, who had signed up to work for the Red Cross and wound up detailed over there. So that made it rather pleasant the few days that I was there. Put on a troop ship, which was rather different from the one that I had come over on some, a year or so earlier.

Wilmot: In what way?

Bragg: It was really meant to carry people, whereas the ship that I had come over in was meant to carry cargo. Not only that, but by now I am an officer, and so I get treated a little bit differently than when had I been an enlisted man. I remember that we sailed from Yokohama and went to Seattle, I think it was. Rather uneventful, about the only thing I remember is seeing whales swimming alongside, spouting. But nothing really of significance happened. I guess the only thing I remember was seeing the—one day I was officer of the day—there has to be somebody in charge to answer problems, so that duty would rotate. So I wound up in command of white troops for a day. [laughs] Believe me, it's only a formality. But that's the only time I had to command white troops.

Wilmot: Was that uneventful?

Bragg: Nothing happened.

Wilmot: Did you feel as if there was a life waiting for you to go back to?

Bragg: Yes, because it's interesting, I had—right now I just want to get home, naturally. It's been interesting being in Japan, despite all the confusion. Still, culturally it's a lot, I learned to speak a little pidgin Japanese, some of foods like sukiyaki and all that, that was fun, I enjoyed all that. I had taken excursions to places like Nara, which is beautiful, all those temples, and the blossoms, I forget the name of this—pink blossoms—cherry blossoms. So it was nice, but it was time to go home. The war is over, and want to get back. Now I want to go into engineering, so I'm planning to get back home, as soon as I can, get back in school.

Wilmot: You told me that while you were in the military, you had really managed to save a sizeable amount of money. So while you were in the military you were planning for your time when you came home. What were your plans?

Bragg: Nothing specific, just saved the money. I had thought about getting married as well, because now, understand, by 1945 I'm twenty-six. Most of my age group had already gotten married. It was quite often the thing to hurry up and get married just before you go into the service, or right after. But I had chosen not to do that. The young lady who I probably would have married, all other things being okay, I didn't want to get married until I felt I had a future to offer. I had no job, no real profession. As a matter of fact, she practically gave me an ultimatum. She wanted to get married, because she had an aunt who had put off getting married to help her siblings go to college, and so she got married rather late and didn't have children, that sort of thing. That wasn't going to happen to her. So I didn't marry her, and she married. But the idea of getting married of course was—you get married! So now when I get home, I expect to go back to school and I expect to get married. I didn't make any specific plans, but in terms of the school I was pretty much determined to go back to the school that had given me what I thought was some pretty good training in electronics that I liked. It was a private school, engineering school. Not noted for physics, but I wasn't interested, I didn't see physics then, what I saw then was electrical engineering. So it looked like a good place, it had a good reputation, it was right there in Chicago. So—

Wilmot: What was the name of this school?

Bragg: Illinois Institute of Technology, IIT. It then was the Armor Institute.

Wilmot: Before we head into talking about that, I wanted to just ask you a couple of questions. What did you find back in Chicago when you came home? Was it different? Was the atmosphere different? Were your aunt and uncle still there?

Bragg: Well, what I found was that for much of Chicago, the war had been over a long time. You see, VE Day occurred in 1945. People began to get demobilized very soon after that, except for people who were staying permanently in Europe. All the veterans had just about left Europe, except those who were going to be permanently in the army. Those who had very little service after that point were sent to the Pacific to fight Japan. Well, the Japanese surrendered, but still we had the occupation.

So, when I'm mustered out in September of 1946, it's more than a year after VE Day. When I left Chicago two years earlier, uniforms were everywhere. Now you look like you were hanging on to the past if you show up in uniform. But of course I didn't have any civilian clothes, so at that time that's what I wore. I remember going to a party,

some woman remarked, "I thought the war was over." People say, "What are you doing still in uniform?" I didn't like that. But I found that the war was over, and things were moving on. People had jobs now that they hadn't had before. When I left Chicago there were no bus or elevated or streetcar operators who were black in Chicago, "because they weren't qualified." Well, the war qualified them. Women too. So now they had blacks driving the buses and operating the streetcars. There are businesses that have sprung up. And the adjustment to the new situation had been fairly swift. Chicago got a hell of a lot more people now, because a lot of people moved there during the wartime to work in plants and so on and never went back to the South or wherever they had come from. A lot of people had come from the rural South so that you would see a lot more country people than you saw before. So that was basically the way things had changed, it had become much more numerous in terms of people. And the level of sophistication I would say had risen.

As soon as I could I went back to go back in school. Well, it turned out that there was a big rush, because of the GI Bill.

Wilmot: I'm sorry. Where did you live when you came back?

Bragg: I lived on the south side where I had lived before, in Chicago, out on the south side at 66th and Evans where I had been living when I had left.

Wilmot: And that apartment was still there for you?

Bragg: No, I was living with an uncle. When I left I was still—now, how did this go? Yes, when I left I had been living with an uncle. I came back and initially moved in with my uncle, but very soon got an apartment. In fact, my brother and I got two rooms rooming with a lady who lived not too far from the IIT campus. But at first I moved in with my uncle and aunt.

Back in school, enrolled in the double-E [electrical engineering] curriculum, but it turned out that there were so many veterans that were ahead of me, who wanted to go to engineering school as well that I had to go to night courses. They put on extra courses. That was all right, it didn't matter, I was in, and at the junior level, basically, which I should have been. And did very well at that until about midway into my second semester of the junior year, I became dissatisfied with not how well I was doing, but what I was doing. The point is that the curriculum that was then in effect for that profession, that field, was a lot less sophisticated than it would be now, in terms of the content of physics, just basic physics. And I'm kind of gung-ho to get moving, and every time we would get to some point where it looked like it was really going to get interesting now, the instructor would say, "Well, this is nice, but we have to go. To go further will be beyond the scope of this course." And I felt, "Gee, I don't want to be in this, I want to be in something where there is nothing beyond the scope of this course!"

It disturbed me so much that I went and took some tests, they had an Institute for Psychological Services on the campus then, and spent a day taking the aptitude tests and attitude tests and things like that. At the end of the day the test is evaluated, you sit down with the psychologist, he tells you what the test said. What he told me is what I already knew, that the test showed I could do well in chemistry and engineering, or mathematics, never mentioned physics—but I'd rather do, deal with things than people,

which I knew. It pretty much just reinforced what I—but it left me nowhere, because it didn't say do this or do that.

Wilmot: When did you know you were meant to be a scientist?

Bragg: I didn't know then I was meant to be a scientist, but I knew that I was unsatisfied with what I was doing. But the answer to your question probably is what I'm just about to say, that I decided, looking at my situation then, "Well, here I am. I can go in any of these directions. Obviously if I can do those, I can also do physics." Why it didn't say it, I don't know. It may be that the people who were making up tests in those days just didn't know enough to make a better test or evaluation. But I said, "Well, at this point I'm going to make a decision based on what I want, what I like first, and worry about practicality later." Practicality probably would have said, "Prepare for a job teaching high school physics or high school chemistry or something like that."

But at the moment, at that point, I, having the results of this test that told me I could do any of it at the university level, well, now I just have to decide for myself what do I want? So I took the position that well, suppose I aim high and don't make it. I can still do those things that I could have done anyway. So there's no great loss, no fatal loss associated with picking whatever I picked. I thought, well now, what did I really like? So far I've seen a lot of stuff. What did I really like? I liked physics most of all, because physics brought in mathematics, which I loved. It was tangible. It was interesting. I just enjoyed learning, and had had a hell of a lot of fun in college physics. Looking back, my sophomore physics class at the community college really didn't have a lot of meat in it. But it had a lot of fun in it. The teacher was a kindly guy who let you make fun out of it. So I decided, "Hell, I'm just going to switch over to physics."

So I went down to the physics department to change my major to physics. I remember the guy, Professor Countryman, the faculty member who handled that sort of thing. He said, "Well, I suggest you to take some course in Education, you're going to be a physics teacher?" I said, "No." And I deliberately never took a course in education, because I didn't want to sell out before I got started. If I had been taking those courses in education, and things got rough right off the bat, I might have settled for less than might be possible, so I'd rather just, if necessary go through some more training if I had to later, but why cut out the training in physics to take courses in education? I had had this experience when I had been at the community college years earlier, of helping people in the Teachers College, go through stuff which was mostly methods and no content. So I knew it was not for me, it had no content. So I didn't see any point in wasting time with that when I should be learning something that I was interested in. So immediately it felt like a load fell off of my shoulders, and I never regretted that change, to go to physics. That delayed my graduation by another year, because now I'm just a junior in physics. But no matter, I was happy to do that, because now I'm where I belong, and I feel just great about it.

I had been on the dean's list before, and I continued to be on it. It wasn't the level of performance that was the issue, it was what I was doing. And graduated—I don't remember, I wasn't at the top of the class, I don't think the issue even came up—but certainly with a good record, a very good record. After the initial shock of having a black physics major in the class on the part of some white students, I never had any derogatory experiences. At first, though, there was one guy—I had a habit of if a

question came up and I knew the answer, I'd go ahead and raise my hand, or if I had an observation to make I would volunteer it. And I remember every time I would do that this guy would break out laughing, as though a clown had made some stupid remark. And after a while the other students sort of, "What are you laughing about?" Well, he eventually got to the point where he was asking me to study with him, and I wouldn't do it of course. Well, I felt like I didn't like his attitude. He learned that it would have been helpful to have me helping him. I'm not vindictive, but I just didn't do it.

But other than that, as far as the students were concerned, I was totally accepted, I was just one of the gang. There was one [area] that I wasn't accepted, though, and that was part-time work. Because some of them in the class were working at the Armor Research Foundation, right there on the campus, had part-time jobs like that. Nobody ever put me up for one. And it would have been nice to have those jobs. It paid money, and you got additional experience, so it was good both ways. It never was really an opportunity that came up with me.

Wilmot: How then did you support yourself while in school?

Bragg: GI Bill. I had GI money, it paid tuition and room and board. I also did reading, read mathematics papers, graded papers and stuff like that for the math department. Also, at the end of 1946, I not only changed over to physics, I got married.

Wilmot: I want to stay with you around your education for one second before I ask you about how you met your wife. So you described to me how you supported yourself. Can you tell me, were there professors at that time who you were working with who were supportive of you or your work?

Bragg: I don't recall any professors who were hostile—now you have kind of a sensitivity about issues around race, how you are perceived by others. You may be wrong, but—. And if you're not a minority, this is a sense that you may not develop. And in some, of course, it becomes hyper-developed, and you jump up and want to fight at every issue sometimes, ill chosen or wrong. But you don't have to be too subtle to see the subtleties. The only time I felt I got the shaft was from a source that was hard to believe, because it was a nice guy. I had this course in mechanics, and I was the star of the class. I remember that when the time came to take the final—up to that time I had great grades. And I got a bad final, and a course where I was expecting an A, I got a C.

I went to see the guy, and he said, "Well, you did a very poor final." But he never showed it to me. And I didn't know enough to demand more, perhaps I should have. He knew I was the star of the course, had to be, because he was the guy who was grading me up to that point. And I can only surmise that somehow the wrong name got on the paper. It's hard for me to believe that that guy would turn out to be a real racist, when he hadn't shown anything that looked like that during the whole course of the semester.

But I mentioned the case earlier of a good old nice lady who complimented all of the black students and gave them all C's, and gave me a failing grade for writing something that I had written, because she didn't believe I could do it. But this case was a little bit different, so I never did understand that. But that's the only time I really felt I got the shaft.

Wilmot: But as far as like mentors and people who you were—?

Bragg: No. Nobody was going out of their way saying, "Bragg, you should be a scientist." That only occurred years later.

Wilmot: Well, while you were in school, were there other students who you kind of formed a community with?

Bragg: There were a few. Now, understand, we're not many to start with. IIT is a private school, first of all. On top of that, it's basically an engineering school. The University of Chicago is in the same town. But that's liberal arts, and it's not engineering. At that time we could throw a house party—we did—and invite every black student in the school, plus their dates.

Wilmot: This is you and your brother, when you say we?

Bragg: No, we black students. My brother, I think, after about a year dropped out—got married and dropped out.

But we would throw a house party, we could contain everybody in one house party, which very often was where we were living, because at the end of the year I got married and we lived with my wife's people for a while, where we had a good sized house. So at the end of every semester after exams we would have a little house party. The girls would bring food, and the boys would bring liquor. But we could contain everybody [laughs] in one house party. So the amount of close contacts that I made as an undergraduate were essentially only those who were—there were even less than the total number, because most were studying engineering, and I had gone into physics. And there were a few oddballs. Like there was one in psychology. There was another one, a guy I had known in the army, in one of those electronic programs, who was very, very smart, John Connor Haynes. I think later one guy went into mathematics, Charlie Stewart. And another guy who came into physics after me who eventually wound up as the owner of a sausage factory. I forget his name now, but it will come to me. But we weren't that many. As I say, you could throw a house party containing everybody, at least all of the ones that I would be tight with. And there weren't that many more anyway, no matter what they were doing.

Wilmot: Did you support each other?

Bragg: Well, yes. I think Charlie Stewart and I did because Charlie, we had almost exactly the same classes. There was another guy named Eubanks, Bob Eubanks, who eventually became a professor at the University of Illinois in Urbana, in applied mechanics. He was very good at mathematics. But whether you were in math, or physics, or chemistry, you tended to wind up in the same courses. That's how we got to know each other.

Charlie Stewart and I used to study together, either at his place or my place. I remember, before the war, he had worked as a special delivery man with the post office. At that time you could make money just going around with your car. Maybe they had a van, I don't know. But anyway, he had worked special delivery, and was married, and his wife was a cosmetologist, which meant she did hair. And they were doing fine. And when he got sent off to the navy, and they sent him to some kind of a technical school in

Hampton—Virginia, probably Hampton University—he said, "If they can make me go to school, I can make myself go to school." So that's how he decided to come back to school and major in mathematics. He might have intended to major in physics or engineering, but it turned out that his money ran out fairly quickly, so he had to go back to work. And when he did, that limited the scope of the time that he could take classes. So it may be that he stuck with mathematics on that account. But anyway, Charlie and I would study, and he and his wife had a couple of rooms in a rooming house. We would go in the kitchen, get on the kitchen table and study together. It didn't continue throughout, but when you ask about support, that was one issue where we collaborated. Nobody there was any further along than I was, so I would say collaboration was probably more like it than support.

Basically, your support was your determination.

Wilmot: Support was your own determination.

Bragg: Yes, nobody was out there saying, "Look, you can do it," and so on. You didn't need that. And certainly from the faculty, I'm not sure indifference was the word, but probably it is. I don't remember anybody saying, "Bragg, you're promising. Have you thought about going on to graduate school?" That didn't come up.

Now, it might have come up finally at the last semester of my senior year, because I did apply to go to graduate school, to apply for a fellowship—an assistantship then. And the assistantships paid a little stipend, and you taught at a lab or something like that, and it helped to defray the cost of your going to school. I was counting on that to take the load off of my GI Bill money, if it came. And so I did, I must have had some kind of indication that it would not be automatically thrown out if I made the application, from the department chair Mr. Thompson, Dr. Thompson. I think I was reading exam papers. I was part of the gang of first-class students already, so that was known.

But to answer your question about support, the mechanisms that we see now, people organizing these centers in the office to go down there, if you are deficient in mathematics you can get tutoring, all that, that didn't exist. If it did, I never knew anything about it. If you needing tutoring you would try to go find somebody who could help you. But an organized support activity like that, that just didn't exist. So I'm a little surprised, that since it does exist, why people don't take advantage of it. There's no reason why anybody should be flunking, in my view.

I did get married.

Wilmot: How did you and your wife meet?

Bragg: She was one of the ladies that I had known—women I had known before going in to the service. She was not part of the literary gang, and I think I hadn't known her very well. I remember helping her once; she was in college before I went off to the service, something I knew very well, probably had something to do with mathematics, some course that had a little math in it. I had met her through her uncle, who was married to her aunt named Violet. He was a partner in a—or had office space in the plumbing and heating business that my uncle had formed with another guy who was a heating- boiler man. So to round it out, he was an electrician. So I knew him, having been around the

office, around the plumbing and heating business. He introduced us somehow, that's how I had come meet her. I was eligible, you know, college and all that, and so was his niece. And he knows me, knows my family, so we were introduced that way.

Interestingly enough, I remember the first time I went by their house. Her father comes in—we're sitting in the living room, and to get to the rest of the house you had to kind of go through the living room—and this guy shows in, looks like if not a gangster a racketeer. He's kind of sportily dressed, he's got a gun. [laughs] It's a shoulder holster, but he's got a gun. "These nice ladies, what are they doing with this guy around here with a gun?" Well, it turned out he was a plainclothes policeman. [laughs]

Wilmot: You're sure he wasn't trying to send you a little message?

Bragg: No, no, he wasn't that, he was a very nice guy.

Wilmot: Okay.

Bragg: He had been a veteran of World War I, so we had lots of interesting conversations about military life and all that. But anyway, the point is, I had met her through her uncle and my uncle, they had been business associates, and that's how that came about.

She was one of the few people that I had known prior to World War—prior to coming home, who was still unmarried when I got back. There were a few others, but I had formed some fairly—well, let's use the word rigid to be—I had thought some about marriage. Understand, my mother and father had separated when I was very young. She had only remarried when my father died, there being no great rush to marry beforehand, I guess. I had seen things, the relationship between sexes, that I thought a lot about, and I began to develop a profile of what my wife ought to look like, I don't mean physically, but what she ought to be, her characteristics. [laughs] She ought to look fairly good; wear well, that is to say when she got old you'd hope that she didn't turn into an ogre; hopefully a good family, because that tells you something about the general atmosphere she comes up in. Nice to be college educated, hopefully you can talk to each other. There might have been one or two others in there, but that was kind of it. Not a very demanding criterion, actually. But a wild streak wouldn't have been something that I would have looked forward to. And that probably was a mistake.

Wilmot: Not looking forward to a wild streak?

Bragg: Well, how to put this? I'm not sure that words that talk about morality are relevant here, but it probably comes down to that. There were some who were not sinners by any means, but they were not saints, and the word kind of gets around. That doesn't make for the best candidate for a marriage, so that was part of the set of standards.

Well, I went out and dated a few other people, but it turned out that she looked like the best candidate of all, so I asked her to marry me, and she agreed. So we got married, no big fanfare, we were married in the bay window of her parents' apartment. She had a bridesmaid, and my brother was my best man. I think there were maybe a couple of other people, one other person, because I remember a guy I worked with, had gone to school with, was the other guy who stood up with me, next to my brother. I don't know why the other person, except maybe she had a friend who wanted to be in the wedding.

But it was not a big deal. It was, you got married, and you got on with your life. Late marriages were still common, and ours was, certainly. We had talked it over, I pointed out that I had made a resolution that I would finish school—that I had had one chance to go to school and didn't really tough it out, and I wasn't going to do that again. "I'd like to get married, but if you can't hang with me going to school, then I'm not going to get married until—I don't want to get married and jeopardize that until I finish school." So we agreed on that. In the meantime her parents said, "Well, why don't you come live with us? You don't have any children, you're going to school, she's working. So we've got plenty of room here, so you're welcome." So we lived with her parents for—

Wilmot: Where did she work?

Bragg: She was working with the welfare department as a social worker. By that time, she's gotten out of college and had worked for a short time in an office of a large black life insurance company at some kind of clerical job. She had been training in home economics, but couldn't stand the disciplinary problems that went with girls at the level when they'd be taking home ec in the black schools. The Du Sable High School held a job for her until she graduated, but she worked at it a very short time and just didn't like it. So she went to work in social work because her mother, who was a stenographer working for a private social work agency, had suggested, "Well, why don't you do social work?" So she went to the city welfare department and worked in the children's division for a long time. That's where she worked. She did social work in the Chicago welfare department.

She worked, and I went to school. Things went on like that until I graduated with a bachelor's degree in 1949 at age thirty. I think our whole physics graduating class consisted of me and two white guys. The classes never were very big. But I don't think any of us found jobs doing physics at that time. Part of it was the general market was depressed. In 1949 there was kind of a bad year.

But on top of that, there was less market for black people with only a bachelor's degree in physics in 1949, as I soon found out, going around interviewing. Not every application that I ever had that was turned down did I save, but I kept a file of a lot of them for—I'm not sure why, but I kept them.

One that sticks out in my mind most was one that I interviewed for a job with the General Electric Company. They would come on campus, and you'd sign up for interviews with these companies, and every thirty minutes they would run you through and take your application and whatnot. So I remember the interview room was in a room in the chemical engineering building. The way the room was situated was that there was a kind of a—these buildings are Mies van der Rohe architecture, lots of plate glass and steel, and lots of air and light comes through. So I could be on the second floor, and the interview room was around a quad, and I could look from the second floor diagonally down and look into the interview room where the interviewers were, see who was there and so on. So, that way I could tell what was going on, or at least see that people were in there. I remember when I saw that my time had come up. They had gotten rid of the previous student and a guy just sort of sat there and smoked a bit, and sort of looked at the watch.

So I come in, and it didn't take me very long to know that there was never going to be any offer of a job from these guys because very soon they began to say, "Well, we don't have too many calls for physicists," which was probably true. But in a situation like that, the interviewers who run upon likely candidates for other divisions are supposed to make a note of that and pass it on. You don't just ignore—if you're interviewing for your company, you find any kind of gems that you can. So, "We don't have too many needs for engineers," or "We don't have—" And they got around to the black issue. There was a black guy in something that they had at GE. In other words, it told me that "You can forget this, this is not going to come to anything."

Wilmot: What did that mean? When they said they had a black guy who was—

Bragg: Well, it's the kind of thing that, when people tell you—that's like saying, "Yes, I know a black guy. Yes, we—there's a black over there somewhere." "It's not unheard of," in other words. But if you've got to scratch that hard, it doesn't look like a very fertile place, it's not very likely that there's going to be another one, if he's that odd. Well, it turned out that nothing came of it. But on top of that, while I'm still sitting there, they bring the next student. Well, they hadn't done that before, but that was just rushing me out the door. In other words, it was kind of rude. They didn't give the impression of going out of their way to be rude, but it was a nuisance, they would just as soon that I hadn't shown up there, I'm sure.

And I remember that one very well because it irked me so much that I went home and made notes about it, and went to different places, to the Urban League to try to get help in finding a job. Being black and looking for a job in physics in 1949 was not a very promising endeavor. So anything you might do that had race consciousness in it, that's what the Urban League did, find nontraditional jobs for minorities, that was their thing. So they had a big program there in Chicago, so I went to see them about it. It never produced anything, but I remember going through those steps in this interview. And mostly you'd interview and they'd say, "Well, thank you," or "We don't know, but don't call us, we'll call you." I had a number of them like that.

Wilmot: Do you remember when you went and requested aid from the National Urban League, what that interaction was like, or what they proposed to do for you?

Bragg: I don't remember the details. I might be able to dig out my file and see if there's any follow-up associated with it.

Wilmot: Yes, mostly I just wanted to know what they proposed to do, and, how they proposed to get you in the door, basically.

Bragg: Well, general, what the Urban League—was to go around and to educate. It had no power to coerce. Persuasion was the way the Urban League worked, that was why Whitney Young was so successful because he was a powerful persuader. He was the best! [laughs] But it was true that people I knew had gotten jobs through the Urban League that were good jobs. So they were either craftsmen rather than—. Come to think of it, the one I'm thinking in particular of was Ernest Price, who did get a good job as a welder at a plant making tanks through the Urban League. And there might have been others. But anyway, it was a natural place to go look for help on nontraditional jobs. But as I say, nothing came of it. I can look up my files and see—

Wilmot: It's interesting because you almost certainly knew this to some extent when you made the decision to become a physicist.

Bragg: That there would be a problem?

Wilmot: Yes.

Bragg: Oh, yes, I knew that. I didn't [laughs] know what problem, but—

Wilmot: So it really shows that in some ways that was just a very courageous decision.

Bragg: Courageous, or whatever. People might say foolish too. "What are you going to do with a degree in physics? Nobody is going to hire you." I mean, that was, when I deliberately didn't take any courses in education, that was basically considered a foolish act. But I didn't think so, because I figured, "Well, if I have to take some courses in education, I can almost fall asleep doing these courses. So why waste my time?" Anyway, I don't mean to go back over that, but you see, it was stubborn. If not foolish, certainly stubborn. But you only come this way once, and that's why I figured, "Well, I might as well shoot high and get what I want. I can't get it, I'll take what I can get." And I hadn't thought ahead to details, except to know that getting the education was only one step toward—you still have got to get a job, and that's going to be the big hurdle that comes down the pipe later, what you finally wound up doing with this piece of paper that you've got.

Well, it turned out that I didn't land the job. I had a number of interviews that were standard; you'd sign up and interview, or look at the papers and watch the help wanted ads and all that. But I took also, it turned out, coming up to my senior, last semester, I took a couple of civil service exams. Civil service for black people in those days was one of the routes to get you into nontraditional jobs, being a little bit more disposed to hiring you based on strictly merit than in private enterprise. That's why, for example, you found the top level jobs in the civil service, most of them that were not appointed were held by Jews who had the same problem we did, except theirs wasn't quite as bad. Everywhere you went to an agency, the guy who really knew something was probably Jewish. His boss might be a Southern cracker, but he would be most likely a Jew, because Jews could pass all the exams.

So the post office was something I could have done out of high school. But it was a job, and rather than not have any job, as a safety precaution I took the post office exam. Actually, I took a test for a job for interviewer with the employment service, which I flunked. But the post office job did come through—

[car alarm goes off—interview interruption]

The point of taking the post office exam was to be sure of at least having a job, irrespective of what you were doing, have some money coming in. I still had some GI money, mind you, so I didn't need the extra money that badly. Actually, I had also my savings, it's all intact. But I don't want to throw it away. Well, the post office exam, I pass it with a high mark, and I was called to take a job right away. Now, for some that was quite a feat, believe it or not. Commonly what happened was that the black guys would get on and work temporary or whatnot, over time they would wind up as being

regularized. But I'm coming right in with no background whatsoever at the post office, and I think there are only a very few black guys in this class of new hires, new appointments that we had. We got a lecture on learning the scheme of things, like what you have got to do to succeed. Part of this involved sorting mail, which meant that you had to memorize which boxes different mail went into. You had a little dummy scheme, they called it, that you were eventually going to have to practice given a set of, a box of mail to sort, to do it in a certain length of time. So practice the scheme, that was the homework. [whispers] Boring!

Well, I don't think I did that job much more than two weeks when the chairman of the physics department called me. He said, "Bragg, we have a cancellation. An applicant who we had awarded an assistantship to has decided not to take it, and it's available if you still want it." So I told him yes! So it meant that now I would go into graduate school. When I told my wife, she wasn't at all elated about that. The reason is very clear, she didn't say that, but it's quite clear. She has already married late, according to the standard route then. We're still living with her parents. We're not buying a home. We don't have any children. I've just gone to school and, it looks like I'm going to go to school forever. So she not only wasn't too enthusiastic, she was pissed off! Now, on the other hand her parents were delighted. "Gee, that's wonderful!" So she was, as I say, that really upset her, it didn't set too well. Probably I should have consulted with her, but I just assumed that—it was a faulty assumption, of course—that she would say, "That's great."

Well, into graduate school, and now I probably don't have but maybe a good year left of eligibility for educational credits and support, rent and food and lodging. Now the way it worked out, I think, instead of coming out in June of '50, early in 1951 I got my master's degree. And there I had done a master's thesis and a theoretical thesis, which meant a lot of mathematics, no laboratory work, just mathematics.

The reason for that was the physics department then was just building up to Ph.D degree- granting status. Not just undergraduate, but graduate degree-granting status. At that time the hot field was nuclear physics. Most people wanted to do nuclear physics, although there were others. But nuclear was really hot. I wanted it too! It looked like something very exciting. I had liked electrical engineering, but in the meantime I had learned about the atom bomb and stuff like that, so that looked like it ought to be very, very interesting. So I wanted to work with the group that did nuclear physics. But that was always subscribed, everybody wanted to do that, and the faculty were going begging for students to work in other fields.

Well, it turned out that the guy who taught our theoretical physics courses didn't have any graduate students, and so the chairman said, "Bragg, why don't you work with Professor Yost [Frances L. Yost]." The rationale was that, "You're going to need a certain mathematics background in nuclear physics anyway. So even though you may wind up doing experimental nuclear physics, the theoretical underpinning, you are going to have to learn it, and so why not work in that. You won't really waste that much time." So that's how I happened to come and work with Professor Yost, who set me the problem of learning quantum mechanical scattering theories.

Wilmot: I have one question before we get to that. Were you posted in Japan when the atom bomb was dropped in Hiroshima?

Bragg: The atom bomb had exploded, that's why the Japanese surrendered, so we went after that.

Wilmot: You went right after.

Bragg: But when we were on the ocean, near Kyushu, Nagasaki is on that island. And I knew when we got there that there had been this strange bomb, which exploded in this city. I could have gotten a jeep and gone down there, but I never did. I didn't know enough about the details to have any appreciation of how outstanding it was. So the answer to your question is, we got there less than a year after, much less than a year after the atom bomb exploded there. But I never was in either area.

Wilmot: You never encountered people or families who had been impacted by it?

Bragg: No.

Progress through the master's program was rather uneventful. I mentioned getting the fellowship right after I started working at the post office, and of course I resigned. I remember the consternation, "What do you mean, you just got here! You're going to quit this job?" I said, "Yes, I am."

Wilmot: "This good job."

Bragg: Yes. [laughs] Understand now, it turns out that this particular black guy, he had a kind of a supervisory job, so there were jobs in the post office that did require a college education. But the basic image in the black community of the post office was you tossed mail. [chuckles] Of course, I wasn't keen to do that or stay with that. But about the only thing that is distinctive about that period was it turned out that the sequence of course offerings, chronological sequence was such that in order to do the thesis that I had to do, I needed to understand quantum mechanics before I could do it, because it is a quantum mechanical theory. But the normal time when the course would be offered would be such that I'd have to stay another year in order to be able to tackle my thesis. So Yost had a very simple solution, he said, "Well, look, why don't you do this, take the course in independent study. I'll give you my notes, and once a week or so we'll get together and I'll see if you understand it." Well, I did that, and I taught myself quantum mechanics, with his notes of course, and his discussions of the notes. And he told me I had the best course that he had ever given, that I covered more ground than any of the students who took his course. Part of that was that I was a good student, but on top of that, what I learned, and that's very important, was that once you are a college-level person, you can teach yourself! You don't need somebody standing up there to lecture at you! At some point, if you're college-level material, you don't need all those lectures. It's nice, and it's convenient, and important, but for just the basic material, unless it's very new material—mostly it's already in a book, maybe in many well written books. If you've got organized material to study, you can teach yourself.

You have to ask, well, after all, everything had a once. And that once guy—somebody had to start with nothing before that. So what it told me was that given the properly selected books and the proper prerequisites—you do have to have something before that—but you can learn anything. So I think that was the most important lesson I learned, that I could teach myself. And not only teach myself, learn well.

Wilmot: I'm going to go back to your thesis, I was wondering if you could talk to me about that in a little bit more depth.

Bragg: The thesis had to do with quantum mechanical scattering theories. First of all, quantum mechanics—why quantum mechanics, and why scattering? Well, nuclear physics, all the work that had been done up to that point, nuclear physics wasn't that old, mind you. Nuclear physics only went back to the middle thirties. In fact, the neutron wasn't that well understood as early as the beginning of World War II. And quantum mechanics hadn't really been put on a fairly sound intellectual basis until about 1926. So the number of people who understood quantum mechanics coming up to World War II, just because it was that new, wasn't that large. It wasn't that common to understand quantum mechanics coming up to World War II.

But the knowledge that comes out of nuclear physics comes from experiments that involve—you have to do experiments, but you have to infer things that you can't see from events that you can see.

The best example I can give of that is the following, it's due to George Gamnov, who is a physicist, and he explained it this way: "Suppose you're an inspector at Mogadishu, and some guys unload a big bale of cotton to be sent to the interior. You're the customs inspector, and you want to know are there some guns hidden inside this cotton. So what do you do? Well, you get out your gun and shoot in there. If there are some guns in there, by virtue of the fact that the guns are metal and the bullets can go easier through cotton than metal, the bullets that come out are going to be changed depending upon whether there's something in its path or something not." In other words, how the bullets interact with what's inside are scattered is what decides what comes outside.

So to understand the nucleus, what you do is to shine bullets into the nucleus. And something comes out which you can observe, and from the way these particles come out, you infer certain things about what's inside the nucleus, and that's what undergirds all nuclear physics experiments. All scattering experiments have to do with finding out what the interaction is at some local level, based on what goes in and what comes out. So all the problems, the theoretical problems end up formulated in such a way that you set up an equation that describes the physical situation and the boundary conditions. A beam of particles goes in, (you have an atom smasher that makes up particles and fires them into some target region). Then you have a detector system out there that detects particles coming out, the direction, the energy, and so on. So now you make a big collection of data of all the angles and things that come out, based on a steady state input. Now you have to make sense out of all that, and that's where the interpretation comes in.

Now, the mathematical description involves setting up what's called in mathematics a Hamiltonian. And that simply describes the total energy of the system. Total energy meaning it's got kinetic energy, that's the energy of motion, or potential energy. Potential energy is energy that goes with this [dropping or hitting noise]. Suppose I hold this little figurine. At this point it's stationary. It's not moving, so there's no kinetic energy. But if I let it go, it's going to fall. And now it acquires kinetic energy. So this energy which is ready to be released, ready to be developed when I let go, is called potential energy. Okay? So all systems either consist of some kind of kinetic energy, particles moving, or potential energy, and that's the forces that are attracting them or

repelling them. So when you set up a proper Hamiltonian, this will then become a differential equation, whose solution then, properly interpreted, tells you something. The thing that you won't know is what the potential is. You make the things that you shoot in. You know that. But you don't know what the potential is, so you have to play around with potentials to make it match what the outcome is. So that is the whole of the theoretical problem of scattering. Whether it's neutrons, or protons, or electrons, or positrons, or fermions, or light even, they all work with the same basic mathematics.

So that was what I had to bone up on in order to do the thesis. And after that I did a systematic study of just about everything that had been done up to that point on quantum mechanical scattering theories. It wasn't that much, but the point I can remember most about it is that in order to write the thesis up, it had to be typed and submitted to the department. And it's nothing but mathematical symbols, page after page! And at that time—this was so common to 1950—that the typical typewriter didn't have these symbols on them. You go to an ordinary typist then, she wouldn't have Greek symbols, and Latin, Roman symbols! She'd have just ordinary type. So I remember hiring this professional typist, and she's typing up these pages, and I'm laboriously writing these—luckily I had a good hand then, I had been good at technical drawing, so I could letter these figures, these numbers, these mostly Greek symbols. But I swore I'd never do a thesis like that again [laughs] I mean, it was just hour after hour of that stuff. But it worked out well. I was told that they used it (the thesis) as a primer to teach new nuclear physics students some background, because I had mostly done what a good review does. Take a look at everything that has been done that is important and summarizes it and put it in a fashion that you can read, you don't have to go and dig up all of that. So it turned out it was useful. For me what it did was to make me very much at home with quantum theory, with scattering theory. Except that in the case of the nuclear particles, you have to understand that the Hamiltonian is expressed in terms of nuclear quantities. It turns out to be a little bit different from the classical case. The classical case is ordinary experience. We throw up a ball, or a car moves down the street, or even a bullet fires into a wall. Those are all things that we can recognize, and take pictures of or whatever. But at the quantum level it's at a level that we don't have direct observations, and the laws turn out to be a little bit different. So when you set up the mathematics, you set it up in terms of what looks like a mechanical analogy, but then certain of the properties, for example the kinetic energy, gets put over in terms of momentum. That is represented by a mathematical operation which—and why this works, nobody knows. But the pioneers who worked out the quantum theory were able to show that if we did certain things with the classical situation, it would enable us to understand the quantum situation.

But now I have this thesis, and in principle if I go to work in a nuclear physics-oriented job, then I had well prepared to be contributing. Naturally, I interviewed with nuclear people, the Atomic Energy Commission. It turned out our old friend General Electric now has a plant at Hanford, Washington. I don't know whether they approached me, or I put my resume in the placement office. However it was hooked up, I was interviewed. I had a very constructive interview, they liked me and all that, and essentially hired me. But in 1951, when this occurred, the McCarthy era had scared everybody to death! And the notion that somebody might show up who was a security risk, that's the last thing the AEC people wanted. So they weren't hiring anybody on the payroll until you had passed the security clearance. And at that time it was spies everywhere! You had to have lived during that time to appreciate the paranoia that went with this manufactured fear of

spies. The horror stories about people who lost their jobs, were blacklisted, young people like yourself coming along. You read about these cases, like the Hollywood Ten, the bunch of writers who were very successful writers before the McCarthy era, were blacklisted, and then didn't work for years. Some of them worked under different names, but some of them couldn't work at all. But professors being asked to sign loyalty oaths; professors singled out with innuendo who were said to be Communist. Not that it was against the law to be a Communist, incidentally. But lost their jobs, and whatnot. So it was a period of a lot of paranoia about security.

It turned out that part of the application form required filling out a security questionnaire, a very lengthy thing. Just about everywhere you ever lived from the time of your birth, they would go and check, presumably, and go talk to your neighbors and all of that. And also, questions like, "Are you now, or have you ever been a member of the Communist party?" That got to be so common everybody knew it. There was a long list called the attorney general's list of subversive organizations. Hundreds of them, just about anything that ever, from the looks of it—. They had gone overboard. I'm not sure if the NAACP was on it, but it might have been. I don't think so, but—. But if there was any left-leaning about it, and if any Communist ever belonged to it—I'm not sure they had to prove that. But the point was that the mere fact of having been a member of one of those organizations was enough to make you suspect. It didn't mean that you necessarily were subversive or anything, but the presumption is that birds of a feather--.

Well, it turned out that I had been a member of one of those. It was an integrated veteran's organization. That right away was suspect, because, you know, you weren't expected to be integrated with white folks. And the American Legion at that time was segregated. I might have joined the American Legion, because there were black chapters, but there weren't integrated chapters. And I didn't see any point in—this one set out deliberately—it had a name like United Negro and Allied Veterans of America [UNAVA], which meant everybody. But Negro was in there. That was a place where if you didn't like the Jim Crow American Legion and wanted to be in a veteran's organization, you could join that.

So I went out and joined it, went to a few meetings, not many. One of their programs had to do with impeaching Senator Bilbo. Bilbo was a Mississippi senator who would use the word "nigger" on the floor of the Senate just like you would say Smith or Jones or Brown, just an awful example of the worst of our history. He was so obnoxious about it that they had campaigns to get rid of him. I certainly was for that. Things of that nature. In other words, it was a protest organization, no question about it, but not terribly active, and on top of that I'm in school, I don't have much time to be running around carrying signs or whatever it was that they were doing. But mainly this wasn't much going on.

So that was the extent of my participation. I don't recall doing anything or hearing any—nobody tried to recruit me into the Communist party or whatever. But I had been a member of UNAVA. I doubt if you could have even found any evidence that I was a member. [laughs] I just said I was! Well that, I'm sure, was the key to the security clearance not coming through. So when I got my master's degree in January of 1951, I had a job but I didn't have a job. And I'm not looking for other jobs, because I got this job.

Wilmot: You thought you had a job.

Bragg: I'm just waiting for the clearance to come. So meanwhile I'm just sort of marking time. And the clearance doesn't come. So I write and they said, "Well, if it didn't come to you yet, sometimes it takes a long time." Well, they had very quickly gone around and done the interviews, the agents coming around to your neighborhood and asking are you a suspicious guy, and stuff like that. In some cases, black people, being very suspicious of white people's authority, go out of their way to try to protect you. So they might have been evasive in some cases. [laughs] Well, there was nothing to be evasive about, but—"Well, I don't know him," or, you know. I don't know if this happened, but I'm saying that that's the reaction to, somebody shows up asking about habits or activities that might have been considered objectionable. The first thing that the black person usually would do is to clam up, say, "No, we don't know anything about it."

And also, it turned out that during the Depression, we had moved so often, sometimes maybe only staying in one place three or four months. There would be nobody around there had even seen me. So a lot of these places, it looks like a pretty chaotic life experience. Whatever. The point is, that the clearance didn't come through. First I decided, well, "It's got to come through!" But in the meantime, I can't just sit here and do nothing. I need money. I'm going to have to go in my pocket now, and I don't want to do that. Now, true, my wife's working, but I don't want to be sponging off of her. So I decided I'll take a job that will keep the wolf away from the door, but not a professional job, because whatever that job is, I'm going to quit it as soon as my job comes through.

So I had a friend who was working as an interviewer for the US Employment Service. Dick Crowley, a good friend of mine. I told him, "Look, Dick, I need a job, but I don't need a good job, believe it or not," [laughs] I said, "I want a job that asks the least amount of details about me but will pay—just to keep—" And I explained why. He said, "Well, it's easy to get you that kind of job." [laughs] "You won't like it, but it's easy to get you one." So he, in a day or so he calls me, he said, "Go over here and see so-and-so at the Dover Electroplating Company," on the north side of Chicago. He said, "Don't tell them you've been to college. He doesn't expect you, and don't tell him." Sure enough, he never asked me, and I didn't tell him. They just wanted basically my name and Social Security number, and that was it.

So I went to work as a helper in an electroplating plant. Well, I had never done any manual labor like that. It was a plating plant. What they did was to—let's say you have a part like that, that's metal, and you want to plate some chrome on it. The metal may be copper or steel, but you want to put chrome on it to give it a nice, bright finish. You would mount these up in holders and then send them through an electroplating line, and various acid or basic electroplating baths, and electricity going through them, eventually it'll come out the end, when it gets this plate of metal on it. And these are decorative, they're not particularly exotic, they just give it a little pizzazz. And being the last hand hired, I'm on the worst end of the job. So this first night I didn't even have gloves. They gave me some gloves that I actually wore a hole in them that night. My hands had blisters on them so bad that if it hadn't been pride I wouldn't have gone back the next day. [laughs] Pride meaning that now my muscles are just killing me, but no, I'll quit after I've mastered this job.

Well, Dover was—they might have had twenty or thirty, maybe all of the total labor force might have been fifty to 100, I don't remember. But basically what they did was electroplating, and there were two kinds. One was the decorative, which was what I was on. That was a big assembly line that did everything—any parts from automobiles or any kind of decorative part like that. We plated chromium and cadmium, those were the two common ones.

So I would drive over there. Most of the common laborers were black. All of them were black that worked on this production line. There was another section where they did what they called hard chrome, and that was more demanding physically—intellectually. Things like, for example, the pistons from the automobile that has a surface that when the car operates, the gasoline is ignited, it expands, blows the piston down and makes the wheel turn. Well, that surface can wear, and in big engines like in diesel engines, rather than go and get some more pistons, they just put some more chrome on top of them, just replace the metal that's been worn away. That was one of the applications there in that section.

So everything in these two sections. I came in, knowing nothing and assumed nothing, at least they assumed nothing, on the bottom end of the assembly line. I picked up a bunch of riders along the way, guys who had just come in from the deep South who made me aware of guys like Muddy Waters that I had never heard of. That was their idea of music and I liked that, of course. But things went along—you don't have to be there but about thirty minutes to learn that job, so that wasn't intellectually very challenging. Every so often a machine line would break down, for some reason. [claps hands to demonstrate] You'd have to stop. The question then is, do you send the men home for the day until it gets fixed, or will it get fixed in time, that the net amount of work will be positive. In other words—[interview interruption]

The work was just basically common labor, not requiring any high level of skill, and the quality of the work was—product wasn't that demanding, it was just decorative chrome put on things either for corrosion resistance or just appearance. As I said, sometimes the line would for some reason have to be stopped. And now we have idle men, and the lead man or the foreman has to decide whether or not to send the men home or to hope that the machine can be restarted in time not to lose that day of production. Well, if they decided not to send the men home, you have to find work for them to do if you can. Usually around the plant there is scrap here and there, there are things that normally need to get done that at the moment are not critical, but sooner or later someone has to do them. So the job then is to find things that need doing and put the men to work doing that until the line can start up again.

Well, the lead man or whoever he was, supervisor gave me a job to do, and I did it. I went back to him, said, "Well, I got that done, what's next?" So they gave me another job.

Wilmot: You gave yourself away!

Bragg: And I went back, [laughs] and he said, "Bragg," I'll never forget this, "don't you know how to fuck off?" Fuck off is a term that means you pretend that you're working, but you're really not. You just sort of go through the motions, make it last as long as you can. Normally it is a way of sabotaging, not getting work done even though you are

going through what looks like the motions of work. But that's just not in my personality. I said, "No, I really don't!" [laughs] He said, "Well, look, don't be so eager!" But what that did, oddly enough, was to earn me a reputation. It didn't take too long after I got there to realize that the line I was on, the guys, they didn't work all that hard, but it wasn't going anywhere, and they weren't learning anything. But you did work harder than the guys who were doing the hard chrome plating. They were rather smug, they didn't associate with us, more or less like that. But I said, "Look, it looks like the work they're doing back there is interesting. How do I get back there?" He said, "Well, I've been watching you, Bragg. You're a good worker, and I'll talk to the foreman about you."

So not too long after that the foreman calls me up and says, "I hear you're doing good work," it's a matter of a couple weeks, "and that you would like to work in hard chrome." I said, "Yes, that looks interesting to me." He said, "Do you have any chemistry." I said, "Yes, I had a little in high school." [laughs] Puts me back in the hard chrome section, I'm assigned to a great big Irishman, maybe 300 pounds, who looks like he is not that comfortable having me come to work with him. And I'm asking all kinds of questions, some of which he can't answer. I have to back off of that. You don't need to show him up. So he picks up and says, "Can you read a micrometer?" I said, "Well, I think I can." (I could have taught the micrometer.) So he picks it up and made the setting on it and hands it to me, and I strained to read it, but read it. He looks at it and said, "Well, you're not going to be on this job long." What he meant by that I don't know. But very quickly I learned the job back there, and pretty soon I had an assistant. [laughs]

Well, it's simple electrochemistry, it's not very exotic science, but it's important, and it's exact in a sense, but it's not that demanding if you've had a little high school chemistry. But that isn't all that goes with it. What happened that got me out of that was one day a couple of the baths were—. The way the plating is done is you take the part to be plated, put it in a rack that has a certain configuration, basically it's like you've got a part here over on this side, on the left there is going to be a source of current carrying particles you want to electroplate on the part. Say it's going to be chromium, chromium atoms are going to come this way and deposit on the part. The part then is going to be connected to electrical terminals by wires so that the current that comes with these parts can complete a circuit. So one's called anode, the other is a cathode. The parts make the cathode. The anode is the metal that you want to deposit.

So basically you've got this configuration that you just set it up, lower it in a bath, hook it up to the terminals and turn the juice on. The bath typically works best at certain temperatures, typically they're hot. Some of the baths can be acidic or basic. Acidic might be nitric acid or something like that, or sulfuric acid, or chromic acid, which it would be in the case of chrome. Basic might be permanganates or other kinds of alkalis, but they are corrosive chemicals. Well, something happened. A new bath been put up that probably had been cold water, but now it has got hot basic chemicals in it. I'm doing something with some parts I'm handling, I've got gloves on. Somehow I get a little chemical inside the glove, and it's hot and it's going to eat into my skin, so I quickly turn away intending to cool it and stop the reaction in this cold water bath, but it is now hot. I had forgotten that they had changed the bath. So that just aggravated the situation. Naturally I snatched it out and remembered where the cool water was.

But that led to a trip to the doctor's office for me, and my hands bandaged up, and it looks like it's worse than it is probably. No more work that day. But I remember when I went home my wife sees this thing and goes into, "Now listen, we don't need the money that bad." And I agreed with her. [laughs] If it's going to be that bad, I don't need that job. So the next day I went in and said, "Look, I appreciate what you're doing for me and all that, but I'm not going to work that job."

Wilmot: Do you still have a scar?

Bragg: I'm not sure. Over time, I'm not sure exactly where it was now. But I had it for years.

Wilmot: Let's stop for today?

Bragg: Yes.

Interview 6: July 9, 2002

Bragg: —alpha, beta, gamma, delta, epsilon.

Wilmot: Wonderful. Today is July 9?

Bragg: Oui.

Wilmot: Today is July 9, and we're here with Professor Robert H. Bragg. This is interview number six.

Bragg: Well, I guess we left off, I was talking about working as an electroplater, having advanced from the level of common laborer/plater's helper, and then injured in an industrial accident in the plant, which struck me and my wife as well as being a bit hazardous.

Wilmot: Just a bit.

Bragg: Especially since I didn't plan to stay in that kind of work anyway. So I went into the supervisor's office the next day and told them I was resigning as quickly as they could replace me, and because I felt the work that I was doing was a bit hazardous. So, "Well, wait a minute, we like your work. Maybe we can find something else for you to do that would work better. How much chemistry do you know?" And I'm not sure exactly what I said, but I said the minimum, so as not to give away the fact that I had had chemistry in college, in fact I had had a couple of years of it.

Wilmot: Or had a master's from—

Bragg: And had a master's in physics. None of that of course was supposed to come out, because I had been hired without any questions about—except being alive. So anyway they said, "Well, go over there to the chem lab and report to Ted," I forget his last name, "who needs a helper." Ted turned out to be the plant chemist, and his job basically was to—the most important job was to assay the chemical composition of the plating baths, and that's very important in getting things to electroplate or to plate properly. There are certain specifications for every kind of job, and the chemistry has to be adjusted accordingly. What was done is to simply, given the measurement of the current chemical composition, that's by sampling, you take it to the lab, determine what's in it, and then determine, well, what we have to do to bring the concentration of chromium or copper or whatever, cadmium, up to specifications. Fairly routine, actually, but it is a white-collar kind of job. I go into the lab and Ted turns out to be a very nice guy, and an alumnus of my old school, which I didn't remark on at the time. He asked me if I knew any chemistry, I said, "A little." So he went through the minimum of showing me what the job was all about. Next, now, I appear out on the production lines in a somewhat more—well, I'm not dressed like a worker anymore, I'm dressed like a white-collar worker, and I have a little chemical kit, and I'm going around sampling the baths. I almost got the impression of applause from the black employees around there, that finally here is a black around here who is doing something other than common labor.

Wilmot: What kind of feedback did you get?

Bragg: It's hard to put into words, but you can look in people's faces sometimes, and it's hard to explain, but you can tell it by the attitude that you see. Something in the body language, the look on the face. Also, you can see the resentment in white people. All of a sudden you suddenly become a pariah. But at any rate, that was the job, and I was now going along doing the job just as well as I had done the other jobs, very quickly, caught on very fast. Not surprisingly, because it was fairly simple chemistry. Electrochemistry itself isn't quite that simple, because it involves more than just chemistry, but electricity and magnetism. But the chemical part, which I was doing, was simple, and anybody with a good solid high school year of chemistry could have done the job.

At any rate I was doing the job fine, and then I did so well so quickly that the management began to put Ted on other jobs. They didn't really need him to do that, quote, "lowbrow scut work," so now they're grooming him for a management job. So when this happens I, my—up to now I've been hesitant, and in fact avoided saying anything about my prior education. But now I feel like it's just not ethical to leave the situation there. So I go up to Ted and told him, "Look, Ted, I've got to tell you this, if my not staying in this job is going to compromise your career here in any way, then I have to tell you, I don't plan to stay in this job." He said, "Well, what's happened?" I said, "Well, I'd like to get another job. I'm waiting for another job."

Wilmot: This is after how many months?

Bragg: Well, I don't know, but it's—I don't remember. It will come to me. So he said, "Well, what's—is that because you've got a degree?" I said, "Yes, in fact I've got two." He said, "What?!" His eyebrows almost shot off his head. I said, "Not only that, I got them from the same place that you got yours." [laughs] And he was just delighted. But that didn't delight the management. He rushes up, figuratively, to the front office, informs the management. Whereupon there's a parade of top management—it isn't a very big company, three or four people—but they have for some reason to come through the chem lab and rinse their coffee cups or something, just to see who is this blood in here who has got two degrees, [laughs] working in our chem lab, and we hire him as a common laborer, words to that effect. I'm sure that went through their head. So for a few days nothing happens, and then I'm demoted. I'm told, well, Ted very sadly tells me, "Look, I'm sorry, but we can't leave you here. If you're not going to stay, you might as well go now." Which in a way made sense. I didn't really have any problems with that. I wasn't going to stay anyway, and I understood the risk that I took when I came clean, more or less.

But this time, instead of putting me on the beginning of the production line, I'm put on the finishing end, inspecting. So in this sense maybe it's supposed to soften this blow, but as far as I'm concerned it's just common laborer again. Parts are coming off the production line, and the inspector has to look at them and see whether or not they are up to quality, in which case they go one place, if not they get recycled.

Wilmot: That's what you were doing.

Bragg: So that's what I wound up doing, that was my reward for honesty. [laughs] Belated honesty. But of course, they had never asked me before. All they asked me when I hired in was, "What's your name, rank, and Social Security number?" [laughs] At any rate, that went on for a while. Now it's clear to me—oh, one thing I'll mention, that in

that job there are—there will be lapses, there will be times when the production is such that you are constantly being employed, you have no time for anything else. And there are other times when something might happen that you have a space of fifteen or twenty minute or something like that where you're not doing anything. What I did during that time, being the same guy who didn't know how to “goof off” as the lead man had asked me earlier, noticed that there were things around the shop, the plant, that needed doing, that normally got put off until the lines were down. A guy who would come in and make extra money doing this clean-up kind of job, moving stuff around here and there. Well, I felt if I'm just not doing anything, why just sit down and do nothing. So I would just go over and take another person, and gradually I got to the point, unfortunately, where I eliminated all that weekend work. I'm sure the guy who had that work was not happy about it, probably, in retrospect, in hindsight I should have just left it alone. But again, that's just not my style. Well, of course, this management notices this as well. So they're just deliriously happy with the fact that I'm still there. I might add that they never did raise my pay.

Wilmot: Even when you became the person who with the chemistry kit monitored—?

Bragg: No, my pay didn't go up. If it did, it was so small that I—my recollection is not that pay was a reward for what I was doing, a good, better pay. But irrespective of that, I remember one time, maybe it was a guy who used to do this work on weekends, came in kind of drunk, if not drunk, high. Normally a little bit of liquor on the breath was not enough to send you home. But he got into it with a superintendent over some trivial thing. But manhood said, “No, you don't take that.” So the guy raises his manhood, and the superintendent fired him. I guess we were both working at the same end of the production line, and the superintendent who had fired him and told him go collect your pay, jumped in the line and starts working with me. So I told him, “Look, you just fired one of your best men.” He said, “Yes, but I couldn't help it, it was insubordination. I had no choice.” And I had to agree with him later that yes, in that situation insubordination was just not one of the things that would be excusable, because the next person, not to do it would encourage people to do that, to be insubordinant. Especially when he was wrong.

Well, at any rate, at this point I decide I really have got to go all out. And first of all, that if I am working during the day, I cannot very well interview for jobs anyway. So best I leave Dover completely and work at night so that I will be free to interview during the day. Well, the best place to go and work at night and not be too tired after you get through is the post office. Well, I am a veteran of the post office, been there once, retired, rather resigned inside of a month. And now I don't have—I'm not on the list of people to be hired, I've already taken that job. Now I'm just a temporary. But it turned out my next-door neighbor where I lived in Chicago was a long-time postal employee who knew the personnel people, and they just said, “Well, look, go down there and tell Charlie so-and-so that I said hire you.” So I got hired on as a temp that way. And now I really see the full force of the low end of the post office job, handling sacks of mail. It was interesting, and I found that like every bureaucracy, the more people you have and the lower the pay, and the dimmer the future, the more the people tend to goof off. Of course I didn't have that talent, so I'm constantly working, harder than the guy next to me. An example would be the way the mail would come in then would be that trucks would come in from all over the city, back up to a platform, and dump the mail off the truck onto this big metal platform. The bags had been separated according to various

regional categories. They then go to various breakdown locations where people will then take these individual mail letters and whatnot and route them to the appropriate designations. Well, this breakdown involves pulling bags which maybe weighed thirty, forty pounds, a heavy canvas bag, and dumping it into a hole or someplace where it goes on a conveyor belt and comes out somewhere else to be distributed. I found there were guys there who were artists at grabbing the bag, look at the tag on it, read it, shake it. And while I've done this and have thrown three bags, they still haven't thrown one. So there is a whole lot of that that went on. But that besides the point, it just told me that there are some people who will goof off even if it's not really necessary, the work wasn't that hard.

But now I'm working at night, and I'm now beginning to hunt jobs seriously, because it looks like I'm never going to get this call from GE, and for all practical purposes I'm starting from scratch.

Wilmot: That must have been pretty terrifying. Was your child on the way at that time?

Bragg: Yes. I wasn't too worried because if you remember, I had \$3,000 in the bank. I guess I felt like well, if I had to, I could go back to the post office. I wasn't that worried, it was annoying, but it wasn't really terrifying. But now I began to really hunt as though I had started from scratch, and I developed quite a number of "don't call us, we'll call you." Now I must have answered, gone to the university's placement office and looked at the help wanted ads and whatnot, that's the only way that I can imagine—well, it must have happened that I was asked to come and interview at two different places that I remember. One was RCA in Camden, New Jersey, which had a plant there. The other was the Portland Cement Association in Skokie, Illinois, which is only about thirty or forty miles up north, northeast, no, slightly northwest of Chicago, in the suburb, a nice suburb. I interviewed at both places.

Wilmot: What does RCA stand for again?

Bragg: Radio Corporation of America. There used to be a time when there were companies like RCA and Philco, that were big broadcast networks. Now times change, and some of these names have sort of gone off into history. I forget what RCA segued into, but it is probably something like NBC or something like that now. But at that time it was big, in radio in particular, and just getting into TV. Interviewed there, Camden, New Jersey, I didn't like, it was a dirty factory town.

Wilmot: You imagined taking your family there?

Bragg: I just couldn't see it unless I just had to, and at the moment it didn't look like—that was just one possibility.

Wilmot: What kind of job were you interviewing for again?

Bragg: I guess junior engineer, or something, some junior job as a physicist. The group I interviewed with was kind of an advanced development group. Exactly what they were doing I don't know, but they were all—usually when you have electronic devices there are more than one kind of—they would involve a team of more than one kind of person that gets it done. If it requires something that's spinning well, you need a mechanical

engineer for example, so that a team might involve a physicist, a chemist, an engineer, and so on. Anyway, I interviewed with this advanced development team and they offered me a job. The only thing I remember about Camden is that I stayed in the—let's see now—the poet, "These are the times that try men's souls—" Well, it'll come to me, but the author of that poem, the hotel was named after him, a revolutionary war—

Wilmot: Whitman?

Bragg: Walt Whitman! It was the Walt Whitman Hotel. And I remember, [laughs] apparently I was the only black person that had ever stayed there. It was so old, it was one of those creaky things with the elevator shaft, and you pull the door and it's like an accordion. You have to have been in an old building like that to remember, to know what I'm talking about, but it was kind of a creaky old place. But nevertheless, that was class in Camden, New Jersey. I was honored and all that, but [laughs] I didn't like Camden, New Jersey. The other thing was that coming back from Camden, you had to cross the river to get over to Philadelphia, to the airport. I had come by train, actually, but there was some problem with the makeup of the train, which would be coming from New York City down to Philadelphia and then back over to Chicago. That train was held up for some reason. I'm sitting around the train station and thinking, "God, I don't know how long this is going to take, why don't I just fly home?" I had never flown commercial until then. So I got on the phone and called the airport, there was a—I forget what they call it, what the exact term was, but non-scheduled airline, or something like that. It was not exactly American Airlines or United, but it was still an airline. So anyway, we have a flight to Chicago, come on out, jump in a cab, go on out. And buy a ticket—it turns out that that's late too for some reason, obviously a different reason I suppose. But I'm so concerned that, "Well, if they had all trouble fixing it, how do I know they have got it fixed?" But I didn't refuse to go, I just wrote a will and put it in my suit pocket. And it turned out nothing happened of course, and sometime later my wife found the will in my suit pocket, and she was pleased to know I willed everything to her, which meant actually nothing.

Wilmot: That must have been a very funny conversation that you had.

Bragg: Well, it was.

Wilmot: "Excuse me," you know.

Bragg: "What's this?" [laughs] Well, the other job was with the Portland Cement Association Research Laboratory. I have to tell you that I hadn't the slightest idea what my background in anything had to do with cement. It took me a while, long after I was there, to begin to see connections.

Wilmot: How did you come to apply there then?

Bragg: Because they had—the way the ad had been written, it looked like something I normally could do but might not find interesting. It certainly didn't sound like cement. But if you take out the guy with the trowel and the boots and the mix and all that, and put it in a laboratory setting, it's just science again. I didn't understand all that then, but that's what it really comes down to. And what's happening out there in the plant or on the job site is a lot different from what's going on in the laboratory. At any rate, it was an offer and

the best way to find out whether you could be accepted or not is go look. So I made the application, I got a letter from the guy who was the section chief saying, "It looks like from your response we might like to have you join us, like to have you come out and interview." And I did. A lovely place, sitting out in a meadow, acres of green grass, spanking brand-new buildings, and most of it doesn't remind me of concrete or cement at all, except that the buildings are built of concrete, of course. It would be hard to be doing things with Portland Cement and not build a building mostly out of concrete.

Well, the interview was interesting because I met the man who became my immediate boss, his name was Lewellyn Copeland. His boss was T.C. Powers, Treval C. Powers. Very personable, very likeable guys, I liked them right away. The lab itself was clean, spacious, there must have been maybe a couple hundred people in the whole place, so it wasn't overwhelming in terms of the size. So I liked the looks of the place, I liked the people that I met. I think—I'm not sure of this, but a guy who had gone to school with me was already working there. If not, soon afterwards. The job description, the description of what cement was all about was interesting, because I hadn't the slightest notion about cement chemistry. A typical undergraduate chemistry course doesn't do too much for you to prepare you for a complex thing like working on cement, which has a number of constituents which then undergo chemical reactions with water, usually, mostly, and a lot of different things are formed, so it becomes a complex chemical mix which has at the same time important physical properties of strength and then it sets and so on. So they're concerned with that, with those questions, why does it set, what's its structure, and so on. The techniques they had been using had been purely chemical—with analytical chemistry, surface chemistry, which I knew nothing about whatsoever. It seemed like, from the description that I had, I still couldn't see what they needed me for. But it looked like the people knew what they were doing, and it was interesting, and they thought they knew.

Well, the most important event of the interview was—the interview itself—was an interview with the vice president for research, who was the boss of the whole shebang. I didn't realize, I didn't learn until later that that never happened, at my level he would never have interviewed a guy right out of college, certainly not even having a Ph.D.

Wilmot: So why do you think that happened?

Bragg: It was very simple. He turned out, Allen C. Bates was his name, Bates turned out to be, if not a flaming liberal, certainly a very fair person. He had worked at Westinghouse, had a rather broad view of the world, and had to deal with critical issues like what to do with a black scientist when they haven't had any around there. I'm the first. I remember distinctly expecting, when I get to the vice president's office, he is going to ask me some heavy technical questions. It turned out he didn't do anything like that. He asked me about my background and where I had lived and all that, and then he said, "We've got a situation here which may be a little bit of a problem. And that is, we have a company cafeteria which is in the building here, and we subsidize that cafeteria, everybody is free to go. But our black employees," he might have said Negro probably, "don't eat there, don't eat their lunch there. They eat out in the powerhouse facility." There's another building kind of remote where they generate steam power, it's kind of, it's not exactly dirty, but at one time there would be coal out there and stuff like that. It turns out when they built the lab buildings, the plant in the first place, they built that place first, because it was warm, and then they built the rest of it, so during the winter, when they would

knock off from work they would go out to the plant and eat. The black guys got used to eating with the blue-collar white guys out there. So when the building, the major building, lab buildings were built and the cafeteria was opened, for some reason nobody, none of them ever came, and none of them still came. So he said, "Now everybody is used to this. Nobody has told them not to come, but they've chosen not to use the cafeteria, and I don't know what—?" I don't remember exactly how he expressed himself, but essentially asked me how I felt about it.

It felt like I'm back in World War II telling Colonel Gench about the showers. I didn't tell him that, but that's the way I felt. Why introduce a problem, that would be the wrong thing, it's the wrong signal. So he didn't say much about it, and this is prior to lunch. Well, when lunchtime came, the vice president, Allen Bates, the director of research, whose name was Hubert Woods, my section chief, section manager T.C. Powers, my boss, Lou Copeland, and I went to lunch together. An example of good management. He didn't have to say a damn thing. When he walks into the cafeteria and the top brass along with him, take me to lunch, that says, "Don't bring me any issues about not eating with black people." He didn't have to write a single memo, that's all he had to do, was just do what he did. I already respected him. However, what his attitude was as a management gambit, that taught me something about management. You can do a lot without writing memos. "By their fruit ye shall know them."

So when it came to that issue I never had any problems whatsoever with—that I could sense—and I'll be a little bit reserved about that—except for one incident that had nothing to do with Bates himself, of course, or Woods for that matter. Or for that matter, perhaps even Powers. But at any rate, that set the tone properly. I got the job, I was offered the job rather. It turned out that the offer from RCA and the offer from the PCA came in, and they were about the same. At that entry level everybody had to pay about the same to get people to come. I think RCA might have been, oh, \$15 a month more or something like that. For that amount of money to have to move to Camden, New Jersey, and not want to be there anyway was hardly worth it. So I took my chances that eventually whatever it was that I had to offer would turn out to be appropriate for what they needed. Back then it was almost fate rather than demonstration.

So I went to work working with L.E. Copeland. Copeland turned out to be an interesting guy. He was a University of Chicago Ph.D. in physical chemistry, surface chemistry. He had done a thesis on thermodynamics of—I forget the exact details, but basically it amounts to—thermodynamics says that heat and energy are interchangeable, and there are several laws. One of them says, the first one says that heat and energy in some sense of measurement are equivalent, and says you can't get something for nothing. In other words, no matter what you do, if you exchange heat from one situation to another, you lose a little. No, that's the second, the first law, second law. The third law says that when you change [laughs] you can't even get back everything you put in. So perpetual motion machines are impossible. At any rate, it's kind of—it's like saying in a way motherhood. Very complex mathematics, and in some respects rather profound, but I couldn't see it as profound, it struck me as rather dull. A preoccupation with certainty. But that is what he had done as a Ph.D., and the work he was doing was—

Wilmot: Can I—I'm sorry—did I understand you correctly, did you say motherhood?

Bragg: When I say motherhood I mean—I probably said motherhood, but the context would be as if to say, well, “Eight equals eight.” Almost stating the obvious. As I say it turned out, it's not quite true. It's much more profound than that. But it seemed to me that way then. For most physicists, although you learn thermodynamics in your coursework, it turns out to be part of the most boring part of the coursework, for most physicists. Nevertheless, that was what he had done.

But the work that they were doing—his section was preoccupied with, had to do with the hydration reactions of cement. The reason for that was that the Portland Cement Association represented an association of all the cement manufacturers in the country except one, and that was Kaiser Permanente, [laughs] in California. What they did was to band together in an association, put a tax of one cent a barrel or something like that on every barrel of cement that was produced, and use this money for promotion purposes to promote the use of cement, help to sell for country, industry-wide, and research, try to make it better, on new products and so on. So the association had a research and development lab which was out in Skokie, Illinois, and a promotion division which was downtown in Chicago, where people didn't have to come out to the lab just to get literature and stuff like that. So we were the research arm, and rarely did we get visits from promotions people, who usually struck me as pretty dull tools, mostly concerned with civil engineering, highways, big concrete structures of various kinds. But the work that we did didn't look like that at all. We were concerned with, as I said, hydration reactions.

The reason why we only worked with hydration reactions was that at that time there was a fellowship, another part of the association which had a laboratory at the National Bureau of Standards in Washington, DC. Now it's called National Institute of Standards and Technology, but then it was the NBS, National Bureau of Standards. By law, at one time, when the Bureau of Standards was established, it provided space, not people or anything else, but space and basic supports like electricity and water and gas, for all major industries in the country. Obviously the purpose of that is to work with these major industries to promote standards. In other words, it's an adjunct to getting quality and whatnot. It's a public service. So the bureau had a group there which did research on the production of the cement clinker, the stuff was in the cement sack. We worked about with the stuff that came out of the sack, and what happened to it when you put water with it. Water, or drop some acid on it, or whatever, things like that. So we were the hydration arm, concerned with hydration reaction.

Now, it turned out the section manager, T.C. Powers, was not a highly educated man formally. He had a bachelor's degree in chemistry, but just happened to be extraordinarily bright and had gotten into the business at an early stage working at a big dam out in Colorado, rather Oregon, someplace with nothing to do except doing routine testing—he was testing batches of cement before they went into the dam, and became curious about more than just testing, and he developed this idea of going into research. How he went about that I don't know, it would be an interesting story—to sell them on the need for research, because he wound up in charge of basic research in the Portland Cement Association research and development labs. As I say, but his level of sophistication wasn't terribly high. His intellectual scope was very high, a very bright man. Now, the work of the association in that area was contained in what are called bulletins. And you worked on generic problems. If the problem happened to be what happened to Universal Atlas in Gary, Indiana, that's not the PCA's problem. But if it was

industry-wide it became our problem, so we worked on problems that would be applicable to anywhere in the industry. So it tends to make it rather basic in that sense.

So that was what I saw. And *Bulletin Twenty-Two* happened to be the culmination of years of research leading up to when I joined. It was supposed to represent, you might say, the jumping-off place. All the inherent wisdom and whatnot was supposed to have been more or less summarized there, and whatever you had to do was probably going to have to be built upon that, to go further. So I set about learning *Bulletin Twenty-Two*, reading it and absorbing all of the experiments that had gone into that. Meanwhile, in order to make sure I don't just sit around and do nothing new, my boss sent me the job of working on a project that in a sense he precipitated, and I'll explain how this goes. Cement, as you see it, cement out there on the street, contains water. Now, it doesn't contain water that you could pick up a piece of it and turn it upside down and water would drain out, but it's contained inside the pores of the cement. If you imagine Swiss cheese, that's not even a good example, but maybe a loaf of bread, it's got some holes in it, make those holes very tiny, and connect it in a tortuous sort of way so that if you blow on one side, some air would come out the other side. In a crude way that would represent the pore structure of cement, once it's set up.

Now the question is, considering that you've got all these compounds in the cement, it sets up when you put water with it, if you stick it in an oven at 100 degrees centigrade, that's the boiling point of water, some water will come out, but if now you put it in a muffler and heat it to 500 degrees, some more water will come out. So you've got water which can evaporate at an ordinary temperature, and water which is not evaporable, and that's called non-evaporable water, and that's very important, because in terms of identifying chemistry in the way that we would normally be able to do it in textbooks, they developed their own lingo, and so talk about what happens to cement when you make it per gram, let's say, or per unit of weight, how much of this is water which is evaporable, how much is non-evaporable, those were quantities that were worked with all the time. Now, it turns out that because material is porous, if you introduce water molecules inside the cement, instead of filling up the pores completely, you simply introduce just enough to put a layer of water molecules just one molecule thick on all the pores inside. If you consider, if you think in terms of this analogy, you will see that you can measure the internal surface area of the cement. The way to see that is this; suppose I cover this plate here with water molecules one layer thick. Now, a molecule is not indefinitely small, it has some size, and we have ways of measuring just how much area on average a water molecule will occupy. So you can imagine, instead of having, looking down at little dots, you look down at little circles, each one of them is touching each other. So now you have got these circles touching each other, covering this whole surface.

Now, if you know how many there are there and how much area each one covers, then you know what the total area of the surface is. Now, you can do all this with just—it's amazing, the first time I saw it. What you do then is to take the cement, to measure the internal surface area, put it in an enclosure, remove all the water which can be evaporated, so now we don't have any water that's loose. Now you introduce just enough water to cover one monolayer, and there are ways to find out how this goes.

Wilmot: How do you do that, just—that part is confusing me, like how you would just put in just enough to do one layer, one molecule thick?

Bragg: Oh. Well, you change the vapor pressure. You have an enclosure, and you—it's all—in other words, what you do, you've pumped out the whole system, it's a glass vacuum system typically. Now you've got in this bulb over here, you've got a provision for removing the evaporable water. It may be raising the temperature—usually it is raising the temperature. Or just by pumping with a high vacuum. Now you close out the vacuum system so it no longer pumps anymore. But all the evaporable water is gone. Now you have another bulb there connected with a valve that you've got a little supply of water, and you open it up and allow just enough water to get into the system to adsorb—adsorb means collect on the surface—so that you get a certain amount of surface coverage. And with that will go a certain pressure that you used to make the water come out of the bulb in the first place. So by changing the pressure that you put on the bulb, you change the relative pressure, relative to the boiling point of the water. In other words, it's the pressure relative to the boiling point of—pressure of water versus the boiling point of water that you are plotting. That's one coordinate.

You can imagine then that the higher you make the pressure, the more surface you're going to cover. So you've got a sigmoid curve like that that plots the weight of water this way versus partial pressure this way. And now—it's a very simple measurement, but it's fantastic. It goes back, the use of this goes back to Langmuir, who studied the adsorption of gases on metals, and in doing this wound up getting GE to solve the problem of brittleness in tungsten filaments. By taking tungsten metal and exposing it to hydrogen gas at different pressures, and measuring the amount of gas which is taken up as a function of pressure. It's called the Langmuir Isotherm, the shape of the curve. But his only extended to one layer. But I might add that Langmuir was an industrial scientist who was sort of a pioneer in that going into industry with a Ph.D. was considered pretty rare back then. But they were very far-seeing, and he solved the problem for them. In doing this he discovered that tungsten filaments were brittle because they had a lot of hydrogen in them. If you managed to get that out, then they were fairly ductile. So God knows how many billions of dollars resulted from just that discovery. To do it he studied the isotherms.

But those isotherms look like a rise, a steep rise and then a flattening off, and then continue to be flat until you get to saturation pressure. But the isotherms that we were getting and that are more common to porous materials, I'll call sigmoid because they look like this, kind of level off, and they take off again.

Wilmot: Sigmoid?

Bragg: S-i-g—s-i-z—I don't now know, I'll have to look it up. But it's pronounced sigmoid. S-i-c-z or something, m-o-i-d. It looks like a kind of a lazy “S,” take an “S” and kind of lean it forward—well, the other way, back the other way. Anyway, it goes up, kind of flattens off, but doesn't become flat but straighten up again. That point of inflection where the slope changes from going this way to that way is usually the point at which the one mono-layer of material has deposited on the surface. Now, how do we know that? Well, we know that because Brunauer, Steven Brunauer, who eventually joined us not long after I was there, another guy named Emmett, and Edward Teller, the atom bomb father, had worked out the theory of this way back in the early forties, when Brunauer, who was a physical chemist, had been working at the Bureau of Plant Industry in Washington, studying the uptake of gases in things like charcoal, roots of plants, and so on. A whole new world, incidentally, is opening up to me, I've never

heard of any of this stuff. I had never heard of Brunauer. I'd heard of Teller, of course. But the BET theory came to be our credo. We use it all the time in studying adsorption.

Wilmot: You said it came to be your credo, okay.

Bragg: Yes. I suppose I'm using the right word—but basically, it was like the Bible, you swore by that like you did by the multiplication tables. We used it all the time in our studies. We'd make up cements; we'd do things to them, and see what happened to the internal pore structure.

Well, as I say, this was a tremendous learning experience because I didn't know any of that, had never heard of any of that. In fact, chemistry was my worst subject. Naturally, you can imagine that I'm not too happy with all this. My first assignment is doing, is reading about chemistry, and on top of that, it turned out that one way to remove the water which is evaporable is to put it into an enclosed chamber, it's called a dessicator, d-e-s-s-i-c-a-t-o-r, it's common around the laboratory. If you want to make sure that moisture doesn't get into something you put it in a closed chamber and put a salt in the bottom of the chamber over a grid of course, which takes moisture out of the air. Barium sulfate is one of them—yes, I guess barium sulfate is one of them. But the one that they had been using was magnesium perchlorate. It was a commonly used dessicant, I don't know what trade name it goes by. Basically, if you put it in a closed chamber and put something in there with a lot of water in it, the water will wind up in the magnesium perchlorate, you've dried it out without ever heating it. Of course, they were interested in doing that because they didn't want to decompose things, they just wanted to take the water out. So they had been using magnesium perchlorate as a dessicant to do the drying studies.

Well, when Copeland arrived with his fresh Ph.D. from the University of Chicago, he wasn't a fresh chemist, but he had a fresh Ph.D. He had been doing lots of work with the U.S. Rubber Company I think, with polymers. Well, he knew that the vapor pressure—over a mixture of dry ice and acetone would maintain a temperature of about minus 80 centigrade, that's 80 degrees below centigrade. (It turns out that's exactly 80 degrees before Fahrenheit too, if you work it out! That's the one point where they agree.) But at that pressure, he had done a few simple experiments that he thought proved drying with magnesium perchlorate gave. In other words, rather than worry with the magnesium perchlorate salt, you could just put your sample into a closed container and apply—and chill it down to the dry ice-acetone temperature, and it would become just as dry, in other words, you would get out just as much water. Well, they began to find—and so in their zeal to—or if not zeal, confidence that we've got this hotshot Ph.D. who has come in and freed us, they began to find discrepancies with other experiments. Well, something is wrong. Either this is wrong, or that's wrong. Or maybe they're both wrong, but something is wrong.

Well, it turned out it was easy enough to measure the vapor pressure over the dry ice-acetone, after all dry ice is dry ice, and acetone is a simple chemical. Whereas the other way was—you didn't know about magnesium perchlorate. Its properties weren't that known. It was known as a dessicant, but in what way was it a dessicant, that wasn't known. So Copeland had started the experiment of measuring the vapor pressure of water over dry ice-acetone as a function of the water composition. That was my job for almost a whole year. I don't remember exactly when it ended. But to do it, what you

did was to take some magnesium perchlorate and dry it to the anhydrous condition. You could do that by heating it up hot enough until you had nothing but your perchlorate. Now in this enclosed container, deliberately add small amounts of water. Every time you added a small amount, which you could measure, measure how much weight it took up, and at the same time measure what the resulting pressure would be. So you didn't know what kind of curve you were going to get.

Well, that was my first research project. It got a paper published in the *Journal of Physical Chemistry*, with Copeland as the senior author, not me. But it was his idea, and I was simply doing what he said to do. But what I found was that there was one hydrate which was known, the hexahydrate, but I found two more at much lower pressures that were not known. So it turns out that if you plotted the vapor pressure against composition this way, you got a curve, not a smooth curve like that, but a curve with discontinuities in it.

Wilmot: So not a straight diagonal line.

Bragg: No, it would be—a limited range of composition would be at one stable pressure. Now there are salts like that, there are cases in the literature, a couple of sulfates, one of them I think, but it had not been known for magnesium perchlorate, and it wound up as a paper in the *Journal of Physical Chemistry*. And it should be in the International Critical Tables. Never been done again, but there would not be much point in doing it again because it was pretty definitive. I did this, I'm sure it was a whole year laboriously doing this experiment over and over and over again and checking things, and finally getting to the point where there was no more doubt about what the situation was. I'm not sure how that worked into resolving the discrepancies that had been run into earlier, but at least we solved the problem of what the dessicant did.

That was the beginning of half a dozen or so papers that we wrote, with me always the junior author. After a while that gets to be a little bit old. At first it's okay, but little by little it begins to rankle. Well, that was my first work assignment. Meanwhile I'm working like mad to try to understand all this stuff that's coming at me in different places. Not too long after I had joined that Steven Brunauer, the "B" of Brunauer, Emmett, and Teller, was hired. You might wonder, well why, how could he possibly wind up in this backwater laboratory. I imagine the manufacturers took note of it because they would get asked these questions, but nobody came running to our door [laughs] asking us to drop everything and come join them. Anyway, that was my first project, my first publication. I wrote it up for publication. Copeland was the senior author, I was a junior. And the practice generally has been that the boss' name goes first, and the junior, however hard he may work, he or she, is the junior author. Initially, of course, that makes all kinds of sense.

And the reason was security. He never said it, but it turned out that either he or his wife or somebody, they had been working in Washington, DC, and had wound up somehow running afoul of the loyalty people, and he lost his job in DC at the Bureau of Plant Industry. I guess, I don't know how they happened to hire him, but they did hire him. A wonderful man, smartest guy I ever worked with, by far. He read that—in six months he read *Bulletin Twenty-Two*, found a lot of errors in it, and absorbed everything in it, practically, and was planning beautiful experiments that had been suggested as a result of what he had found. When he joined, I was essentially assigned to Copeland and

working with Copeland. I was already working with him, but when Brunauer joined they hired another guy, Dave Kantro, who was getting a Ph.D. at IIT in physical-organic chemistry, who worked with Brunauer. So now we have these two teams kind of friendly battling with each other, who work on the same general class of problems.

Well, in the meantime it became revealed to me that the reason why Copeland was interested in me—he was the guy that saw merit in my application, when he saw the word "scattering." That was what got him, because you see, in all experiments where—I might have said this earlier—where you want to find out what's inside of something and you can't look in there with the naked eye, you send in some kind of a probe and you look at what happens when the probe comes out the other side. If it's very dense then you get a response one way, if it's not dense another way, if it's magnetic you get a different response. Scattering by either light or neutrons or electrons, or any particles for that matter, all have their distinctive uses depending upon the materials you were concerned with and the phenomena. But he had worked as I said in the U.S. Rubber Company working with polymers. He was familiar with the work of P.P. Debye. Debye is a famous physicist who was still alive years after I arrived there. Debye had got a Nobel Prize already, and had been a consultant to Copeland's group when he was with the rubber company.

Debye had worked out some studies of studying the internal structure of plastics like Lucite or, I guess it was the most common example that everybody would know about would be Lucite, it's a clear plastic methyl. Methacrylate is the chemical term, but it's called Lucite. What he had done is to show that if you use visible light collimated into a fine narrow beam, shine it onto a rod of Lucite, it will be coming out of it, so if you measure the angular distribution, the intensity versus angle, then you can deduce certain things about the domain size of particles inside the Lucite, even though you can't see them.

So Copeland was aware of this, and he reckoned that if we could make cement transparent enough to shine light through, then we could learn something about the pore structure of cement from the light scattering. That would be step number one. But if not, if you went to x-rays—now, we know x-rays will go through if you make the material thin enough. There was just coming into being, this is 1951, just enough is known about the scattering of x-rays at small angles to know that we could learn a lot if we could have a small angle scattering, do small angle scattering experiments. But at that time they were not being done in any organized fashion, there were only a few people doing such studies. But at any rate the suggestion was—and let's do two things. Let's get some light scattering apparatus to try doing light scattering by cement with the understanding that it probably won't work. But in the meantime let's learn how to do x-ray small angle scattering.

So then my job became two-pronged. One was to design and build a light scattering apparatus and to make cement thin enough to shine light through it. The other was to learn something about x-rays. Well, the first one I did [laughs] by taking what little bit I learned about optics in school and made a very crude apparatus, designed a very crude light scattering apparatus. You could buy light sources for spectroscopy experiments, light filters, so we could do that. I didn't know anything about photometers at the time, and we didn't have any money to buy any. So what I had to do was to design an apparatus, and here again, Copeland was a guy who read the literature very thoroughly.

He had come across a design of what's called a microdensitometer. It's a micro-density reader, which means if I shine light through a piece of film I can assign a number to its blackness. And the blacker it is, the bigger the number, you could do this quantitatively. So I could then assign numbers to light blackening around, as light would go through whatever I'm shining it through. So that would be proportionate to the intensity.

Well, the one thing I learned about that was that if you can possibly buy it, don't ever build it yourself, because the chances are when the guy—by the time the manufacturer gets ready to put it on the market, he's made all the mistakes you're going to make. But you'll only do it once, and he's going to sell lots of them. So better not to—unless you just have no choice whatsoever, always better to buy rather than make yourself. We didn't do that, and we wound up building a Cadillac, which we almost never used thereafter. It worked, but it took months to build. Everybody was learning something new, was learning to use metals they had never used before, and all that. I'm learning, in the meantime, how to mix up cement and make small amounts of it such that I could make a hole in a little piece of metal, put a drop of cement on that, and it would cover like a film. So I actually made thin films of cement that I could shine light through! It wasn't like it was transparent, but light would go through, and actually finally did some light scattering studies. And they gave me numbers that made sense, from the experiments, but didn't make sense from what we thought was the internal structure. At the time I couldn't understand it, and we didn't really move very far in that direction.

But the other direction, the x-ray part, he didn't know anything about x-rays and I didn't either. So I was sent off to Brooklyn Polytechnic in Brooklyn, New York, one summer for a summer course just to learn how to use x-ray equipment. They had been budgeting, in the annual budget request, for x-ray equipment for quite some time, and it looked like we were about to get it. So it made sense to have somebody on the staff who knew what to do with it when we got the money for it.

So that's happened, and I went off to Brooklyn Poly, met some interesting people there, got started learning how to use the equipment. Very soon after I got back the equipment was purchased, set up in the laboratory, and right away I got involved in really learning how to use the equipment. A lot of things that are now to be found in books weren't in books then, either in the original literature or had not even been done. So I did a lot of stuff, essentially getting up to the point where I could believe what I saw. And then began to apply it to our materials.

So I'm now the lab's expert on x-ray crystallography and x-ray diffraction. Very early on I was able to examine some of the magnesium perchlorate that I had worked on, found out that some of it decomposed to magnesium oxide, which I didn't know. And in some other experiments they had been doing, grinding experiments with water, that produced products that had very low surface areas compared to the materials that were hydrated without grinding, but otherwise chemically were identical, and I was able to show that the ball milled material turned out to be similar, was essentially a synthetic material that could be found in nature. That was a big surprise.

In general, the x-rays brought a whole new dimension in terms of what you could do, and not surprisingly, to what was available in the laboratory at the time. So I became like a poobah. I'm the resident expert on x-ray diffraction. I'm—not—to make sure it was useful I began to set up little courses in the lab to teach people how to use it, what

to do, how to interpret what they saw, in other words, make it useful. That was always my impression of what needed to be done. And meanwhile work on the idea of a small angle scattering, knowing absolutely nothing about that. There were no books on it. If so, they were maybe just barely coming out, and never having done any or worked with anybody, I looked around for people who had done something. There was one guy at an oil company who had done some small angle scattering work, rather crude, but I went to see him and got a lot of encouragement.

In the manufacture of cement, clay minerals play a role. What you need is a source of calcium oxide, and that's easily obtained from limestone, (that's calcium carbonate, and all you do is heat calcium carbonate), the CO_2 goes off, and you've got calcium oxide left. So you automatically get calcium oxide (CaO) if you just heat limestone. And you need silica. Silica is to be found in sand, SiO_2 that's all it is, with other impurities, naturally. So a source of silica and a source of limestone is what you need to make cement.

Now, cement has other stuff in it. Some of it is there deliberately, and some of it is there just accidentally. But basically you've got scoops of limestone and scoops of silica, or sand, put in a big tube about as big in diameter as I am tall, and maybe as long as a football field. This tube is now caused to rotate, it's got a slight pitch to it, so if you put something in one end it rolls downhill to the other end, and you fire a beam, a torch of heat—it's called burning, literally—just put a big fire in it. It probably is running about a third of a way up this tube to heat up the contents of the tube. You just set this thing to rolling. In the top end you're dropping in this limestone and sand, and it's tumbling down, and as it goes down the tube the device gets hotter and hotter and becomes molten. And then—no, first I guess the gases go off, but then it becomes molten, and then it reacts chemically to form chemical compounds of calcium oxide and silica. Essentially that's what is—the cement that you get out of the bag. But it contains other things, aluminum oxide, and that often comes—in deposits you have of silica very often will have aluminum with them, and maybe a little iron, that's from balls that ground up this stuff in the first place, iron balls in a ball mill. You didn't want that there, it's a tramp, it doesn't hurt anything in particular. So that stuff that tumbles out the bottom is red hot, it's called clinker. It's allowed to cool.

Wilmot: Clinker?

Bragg: C-l-i-n-k-e-r. If you ever were around a coal-fired stove you know that sometimes the coal has impurities in it and it doesn't all burn up and some of the stuff is kind of fragile, but it's not powder, it's called clinker. In a way it's, I guess by analogy it's called clinker. The clinker is ground—although gypsum is added to it so it won't set up too fast when you make it, put in barrels and sold. That's the whole manufacturing process.

Well, in order to look at the synthesis of these compounds that eventually are going into making the finished product, you will run into clay minerals, after all you're digging things out of the ground, and one of the most common minerals in the ground is clay. So it's kind of hard to escape looking at clay. And when you do that you run into other clays—being the way I was, I was constantly studying everything, not knowing what not to study. So I got involved in clay mineralogy, and I discovered that there were some clays, vermiculite is one, montmorillonite is another, [these are both little towns

in France, incidentally, where these particular minerals were first identified] which have the property that if you put them in the presence of water, they expand. In fact, some of them are responsible for what's called frost heave in roads, that during the wet and dry seasons, the roads will go up and down or spread and crack. The common term is frost heave, but it happened in the summer as well. The point is that I got used to the idea that minerals could have layer structures that have water going in and out of the layers depending upon what the humidity conditions are. Now, that turned out to be very, very important, because it stuck with me the rest of my life.

Wilmot: And that was what you termed here, "the revelation."

Bragg: Yes. Because when I—at first I just thought of this as applying to some clay minerals which might or might not wind up in the cement. But then I got to thinking about the cement itself. One of the peculiarities of the studies that had been done in *Bulletin Twenty-two*, this is that famous bulletin that had all the knowledge up to a certain point—was that if you studied the non-evaporable water, which they called W_n , and you studied the weight of water that it took to cover just one layer, it turned out that that ratio of W_n to the non-evaporable water was one or something like that. Almost exactly one! Or maybe it was two. But anyway, the point was, it was an integral number. And everything up to that point about cement that we had studied, there was no reason to expect an integral number. So the question is, well, how could that be?

There was one clue that helped to get me on the right track, and that was that if you did the same experiment, instead of using water, you used nitrogen, you got a different number. In other words, the nitrogen molecule seemed to see an entirely different surface than the water molecules. How could that be? And also it seemed that if you did the experiments with, say, a molecule like alcohol, which is slightly polar, you'd get different results if you would use molecules that weren't polar. So that meant that there is some chemical reaction going on when you put in these polar molecules. Well, that led to a lot of soul searching, a lot of looking at possibilities.

Finally, somewhere in England, a geologist published a structure that indicated that hydrated cement—calcium silicate hydrate, rather, which is the major constituent in cement, probably had a layer structure. I remember the "Eureka." That Christmas I was out for the holidays, and I got to thinking about what if the water molecules that we're talking about, some were chemically bound, and that meant that—there would be a definite number for every formula unit, and some were physically bound, but there were only so many you could put in one unit cell. That would lead to an integral ratio of W_n to the non-evaporable water. The question would be, what would be the ratio, if it's true?

And I don't remember all the details now, but I remember spending that whole Christmas holiday working out the consequences of this assumption. It turned out that everything worked beautifully. Using these ideas, I could just about reproduce that whole of *Bulletin Twenty-Two*. The thousands of dollars spent to generate all these numbers, I could calculate them. It was such a revelation, it just blew my mind. I wrote it up to some extent, there were a few blind spots that I couldn't quite resolve, but I couldn't let that stop me—everything else was so good, it had to be almost true. And the little bit that wasn't true, you should worry about it, but don't give up because that only that is not true. That was where Copeland and I were different. He would see one thing

wrong and throw out the whole thing. I would see one thing wrong and say, "Well, let's concentrate on this, but let's find out, maybe we can explain the thing that's wrong."

So I remember going into the lab that Monday after the Christmas holidays with this write up just—like a dog and takes the ball up there and gives it to the master, and expects to be patted on the head, and he damn near got mad! And the reason was—well I'm not sure what the reason was. But he very quickly saw the flaws. His response was that—as if to say, "You haven't done a damn thing. Explain this!" And I'm saying, well, I feel like, "Look at the 95 percent." [laughs] "Damn the 5 percent right now. Isn't this great?" And he couldn't see it.

Well, that upset me. But I said, "Well, look, do you mind if I show it to Mr. Powers," who was his boss. "Sure, go ahead." Instead of saying, "Look, we've got to go show Powers this," he was very, very negative about it. So I took it to Powers, sort of explained what I was doing, and went back to my work. Well, it turned out that Powers was getting ready to go to a meeting in Stockholm to give a very important paper, and for his illustration of the structure of cement he had used little amorphous balls stuck together. Well, when I saw that talk again, he rehearsed it again, he had put in layered structures. In other words, it was clear that the balls, the diffuse uncertainty that had been there before was replaced by something much more specific. And so Powers had bought it, how much I don't know, but certainly he saw that this was essentially—it's got to be dealt with.

Copeland is upset about it, he doesn't like it. Well, that kind of soured things. Up to now I'm the fair-haired boy and I'm producing papers and all that, and we're doing okay. But it seemed after that, Copeland began to redouble—let's back up, that's not quite true. I became conscious of being asked to do things that I, having learned enough about x-ray diffraction to understand the principles, could see that the experiment is not going to work. But he doesn't know that much, he's my boss and he's got a Ph.D., and I haven't. But I know that subject better than he does. I know it's not going to work, and I tell him so, he said, "Well, do it anyway," and I do it anyway, it didn't work. And after you do two or three like that you're not too receptive to the next one. It might have been good, but you're not terrible receptive anymore.

So our relationship began to sour. I'll jump ahead and say that one day we got into it over something, and I'm no longer being that diplomatic, I'll have to admit. He said, "Well, you know, Bragg," now, he might have said "Pete," but, "if you weren't colored, I'd suggest you look for another job." And that really hit me, because what it told me was that in a way, I was there because I was colored, and they felt if I should complain, where could I go? That was more or less what it turned out to be, it seemed to me it must have been. "If you weren't colored, I would suggest you look for another—because if you leave here you're out of luck!" That would be the impression.

I've jumped ahead, because in the meantime, we're concealing—we're working ahead in this direction—we're not telling—we're telling Powers this, but we're not telling Brunauer and Kantro this. They're competitors in the lab. Understand, up until this point Copeland was the fair-haired boy in this laboratory. Up to Brunauer's hire, there's nobody in the whole laboratory who knows—who has got a better background in terms of basic science than he does. But now here comes Brunauer, who is famous. He hasn't been in cement chemistry for long, but he is famous. He has got a whole technique

named after him. Every physical chemist and chemist in the world knows who Brunauer was, to this day. But Copeland doesn't see him as any more than himself—[laughs] he puts on his pants one leg at a time, as far as Copeland is concerned. So we'd have these faculty—these department meetings, and if Brunauer might misspeak, you know, and say three instead of four, and Copeland would jump on him as though he had made an irreparable error. Everybody was talking about, "Why does he bother with that?" After a while you realize it's just envy, and jealousy, and it's sad. And Brunauer of course never lets on, he never indicates that he is miffed by all this, but I found out from Kantro this he is—that every time one of these happens he puts on a bland face, but in private he is seething.

But if you roll the layer up, then it could be—the layer could be quite long without occupying a big lateral dimension. Now he just showed me, you take a piece of paper, here's the reason why you have that. You just roll it up. Ah, it's beautiful. So why the spiral growth was another matter. That we didn't know then, and I don't know if that ever was resolved, it probably has been, because polymers do that. It could have been this rather than that, but since it was the tortuosity that made the difference. Well, things got to the point finally where I said, "Look," I must have gone to Powers and told him of our findings, "I think we really ought to tell Brunauer and Kantro about what we're doing." And he had realized that we had this internal conflict and said, "Well, yes, you should." So I went to see Brunauer and I explained to him what we were doing, and far from being upset by it or in any way taken aback, he supplies the missing link, that part that Copeland—was the thing that hung up on, he showed me an easy way out of it. It amounted to following that if you have got layered materials like this, and you have got to put molecules in between the layers—

So we saw a problem for him, and he saw a problem for us. That was going along fine. But finally one day something happened, and what it was specifically I don't know. But when Copeland made that remark to me—oh, one other thing had happened. Up to that point, and the first three months at the PCA I was there I think, I got a raise. The next six months I got a raise, and thereafter I got an annual raise. But the last raise that I got before I left was less than the previous raise, and I thought that had been my best year. If anything, I should have gotten a bigger raise based on what I had been doing and the results I was getting. So I go to Powers, who was a wonderful guy and all that. I asked him, "Does this represent the evaluation of what I did last year?" He said, "No." He said, "Well, yes, you've done very well." "But I've had a better year than last year." "Yes, but you're getting up there now, and you can't expect to be getting raises like you've gotten up to now. And besides, the company has to pay for draining that field out there." The lab was sitting on a great big meadow, acres, and it was so big that at lunch time guys would get out there and drive golf balls. They could never drive them far enough to lose them, it was just that big. But it was kind of flat, and when it would rain sometimes water would collect out there and it would dam. So to take care of that they put in some drains. Well, it cost money. [laughs] Well, I couldn't see what the hell my salary had to do with draining that lot out there! That wasn't at all satisfactory to me. And with Copeland's remark about looking for another job, I started looking for another job. I'm so angry, no mentor had told me how to handle things like this. I remember interviewing at Visking Corporation, which had just been bought by Union Carbide.

Wilmot: Visking?

Bragg: Visking, V-I-S-K-I-N-G. I'm sure it no longer exists, it was swallowed up in Union Carbide. But they made plastics. And I had a very profitable, very encouraging interview for a job there, until I went to see the boss. It turned out that the boss, that the assistant boss was a black Ph.D. in chemistry I had never heard of, had gone to school at McGill University in Toronto, was unknown in the black community, didn't go out to get his name in *Ebony* or anything like that, he was just, he had a very responsible job, and he was vice president, vice whatever it was of the corporation. And black and all that, I had never heard of him. It taught me a lesson about looking for notoriety, he just didn't care, and in fact was uninterested in it, and so nobody knew who he was. But there he was, sitting next to the great God, Jehovah. When I explained why I wanted to leave, I complained about my boss, which is the wrong thing to do. "Well, how do I know you're not going to get in here and complain about us?" [laughs] So, of course he had a good question.

Wilmot: What was his name?

Bragg: I don't remember.

Wilmot: Okay.

Bragg: I can find it eventually, but—. But he did remark, "Well, maybe his boss could have been a real son of a bitch, but just the same—. So, well, what we'll do is we'll match your pay." Well, I didn't like that. Matching pay was not exactly encouraging—I'm not exactly sure which matched pay was being matched, but it didn't—it rubbed me the wrong way to have that attitude, even though I was wrong.

But also I interviewed at National Semiconductor in Evanston, which had a small plant there. It wasn't anywhere near as big as it eventually became. Guys that I had known at IIT, in graduate school, were working there, and they wanted me to come. They made me a good offer. But also, the guy I had been taking x-ray courses from in night school, who had been encouraging me to go on and get a Ph.D., needed an assistant at the laboratory at the Amour Research Foundation right on campus, where I could go and work during the day, and walk across the campus, take the time off, walk across campus and take courses. And much more of a congenial environment, because now we'd be doing exactly what I wanted to learn how to do best, and that was x-ray diffraction.

So of those jobs I took that one, and I left the PCA with no real regrets. Well, a little bit of sorrow, because I felt I had been misused, and the reason was this: When I went out finding other jobs, I had several now, all at more pay than I was already getting, I went back and talked to Mr. Powers, told him that I was going to resign within a month or earlier if somebody could be found. He asked, "Well, how much are you getting?" I told him. So I went back to my office, my laboratory, and he comes in and tells me that, "We'll match it." And that really made me angry, because I felt that if I was good enough, if they could have paid me then, they could pay me more now. I had depended on them to look out for my interests. I felt, naively, that all you had to do was just work hard, do your job, and your reward will come.

Well, I learned that that's not true, and from that point on anybody that ever worked with me, for me or around me, I'd tell them, "Look, every two or three years go out and interview, find out what somebody else is able to, is going to offer you. Look at the

whole picture now, don't just look at salary, but look at the benefits and all that, and look at job satisfaction. If on balance what you have is as good as could be offered, no point in leaving. But if there is a significant disparity, what you need to do is to go and give your employer, your boss a chance to rectify things which obviously are wrong. Because if you're good enough for this much money on the market, that's what the market is going to cost them to replace you." So the boss might as well keep the guy he knows. But he may not know that. He may be just as ignorant of the market as the PCA people were. See, they thought, "Here's Pete Bragg, this black guy, where can he go? We don't have to offer him or give him the kind of raises that we—continue to do that, we don't need to because he has no choice." That must have been the mentality. I didn't say that, but I told him, "I wish you hadn't said that. Because I really, I assumed when I came to work here and did good work you would compensate me according to it. Now you tell me that you are willing to match this pay. I'm sorry, I just can't stay."

Wilmot: You said that to him?

Bragg: I'm not sure how I said it, but I said, "No, I won't stay." Now, it's true, suppose they did match it. I might have to go through the same damn thing again, who knows whether they got religion or not. Besides, I was going to do x-ray diffraction, whereas I had already essentially outgrown that laboratory. At the level where they were then, I had just about outgrown them. So I took the job at the foundation, because I would be working for the guy I had had courses from, who had a high opinion of me.

Wilmot: That was Azaroff?

Bragg: Lee Azaroff, Leonid Azaroff, as his assistant in the laboratory. We're doing solid state physics, and I knew other guys there too, and so I could then really plunge in and learn x-ray diffraction, get paid to do better, take courses, work on my Ph.D., and everything looked better. So I took the job at the foundation and I never regretted it. I had a big boost in pay from what I was getting. Inside of about three months I got another big boost in pay, so I damn near increased my pay by more than 50 percent in a matter of a few months. But the lesson was, every so often for any number of reasons you need to sample the market and find out what you're worth. If there's a considerable disparity, then it's to your boss' advantage as well as yours to confront him with it, him or her. But you don't do it with threats. What you do is to first get the offer in hand, in writing. Then you go to your boss and say, "I've got a problem, and perhaps you can help me with it." And hand over the offer, and indicate that, "I really like it here, but this does present a dilemma." If he's wise he'll say, "Well, I'll take that under advisement." He'll go off and he'll decide, "Well, yeah, if he's worth it, we're going to have to pay that much to get somebody like him, in which case we might as well keep him," or, "No, we don't give a shit, let him go." But you have to be ready to go, otherwise once you have bluffed and they call your bluff, they can kick you around. You don't stay if you've bluffed and they call your bluff. You've got to be able to back it up. But as I said, everybody who ever worked with me from that point on got the same lesson, "Look, find out what you're worth, and if you're overpaid, shut up; if you're underpaid, well, go about it this way."

Wilmot: Yes. I have some questions for you about your time at PCA. It seems to me that during that time—I know when you started at PCA you were living with your in-laws, is that correct?

Bragg: Yes.

Wilmot: So what changed in your family during those five years?

Bragg: Oh, a lot. The job at the PCA was in Skokie, Illinois, and that's on the—northwest suburb of Chicago. And it's quite a commute from where we were living. The closest town where there might be any significant number of black people—and you understand the pattern of residential segregation being what it was—that meant that I would have to be living in a black community—was Evanston. But also not far from there was Glencoe, Illinois, which had a much smaller population, but still a few middle-class black people. One of the technicians at the laboratory happened to live in Glencoe, and he knew that there was a black woman podiatrist who lived in Glencoe who was getting ready to move to Denver, and her place would become vacant. She was renting a house, actually. Well, one thing led to another, and I wound up taking over this house from Catherine Corbin. Our son was born in May of '51. By the fall I'm in this job, and this house becomes available. So up to now we're living in rather cramped quarters to begin with, with this baby, but now we've got a whole house.

Wilmot: You bought a house, or you rent the house?

Bragg: Rent. It's got a living room, kind of a sitting room, a regular dining room, a huge kitchen, two bathrooms, three bedrooms. In fact, we don't have enough money to furnish the place. We don't have enough furniture to furnish the place. Catherine sold us a lot of her furniture, she was moving to Denver, and we bought a few odds and ends. But now we've—our whole living situation is just totally changed.

Wilmot: Do you have a car at this time?

Bragg: Oh, yes. I had a car all along. I had bought a car right after getting out of the service.

Wilmot: That was your first car?

Bragg: It was the first one I had ever owned, yes.

Wilmot: What kind of a car was that?

Bragg: The first one I bought was a used 1937 Plymouth, but I didn't keep that too long. I think by the time—I don't know when I bought the first Chevy, but I think by the time—I know. By the time I had finished college—no, maybe a little bit later than that. By the time I was working at the plating plant I had bought a brand-new Chevy, I guess it was. So we had a brand-new car. And a brand-new job, we have got this house, and we're furnishing it, and a new kind of life. These were very exciting times then. Not too long after that I started taking an evening course on campus at IIT, because in this flurry of all these new things coming about I discovered that there are a lot of things I don't know that people take courses in. So I took my first course in x-ray diffraction because that was what I needed most to augment what I had learned at Brooklyn Poly over just a summer.

Wilmot: I had a question for you before we talk about your classes with Leonid Azaroff, I wanted to know your son's name, how you named your son.

- Bragg: My son? My wife named him, it's Robert H., III.
- Wilmot: So she named him after you?
- Bragg: Tradition I guess. But she named him.
- Wilmot: Okay. Was your second child born at that same—?
- Bragg: No, two years later, Pamela. She's named Pamela. Probably named her too.
- Wilmot: Okay. Who was Pamela named after?
- Bragg: As far as I know—I don't know. Because none of her relatives are named Pamela, as far as I'm aware. It might have been popular at the time, I don't know. There used to be waves of people name Jennifer or whatever, depending upon what year it was.
- Wilmot: Yes. So you were saying that you—
- Bragg: Well, I went to work at the Armour Research Foundation, and in the meantime changed locations.
- Wilmot: Is that when you started taking—when did you start your night classes?
- Bragg: Yes.
- Wilmot: That was then?
- Bragg: After I had been there about a year.
- Wilmot: At the ARF.
- Bragg: Yes. When I first moved there—let's see, let's back up. I'm not sure that's the case. It's more likely that I had already begun to take classes at the IIT, where ARF is on the same campus. It was the Armour—IIT used to be the Armour College of Engineering, it combined with Lewis Institute to make one Illinois Institute of Technology, that's the way it came about. But with the Armour College of Engineering there was the Armour Research Foundation. One time it's big—it did a lot of contract research for industry. But its big product was magnetic recording. Just about all of the patents on sound on film and magnetic recording generally came from one guy, who had learned about wire recording during World War II, just prior to World War II, and adapted that to tape.

An interesting story, I know it's a digression, but his name was Marvin Camras, an interesting guy. He was from a middle-class Jewish family from the suburbs, kind of a nerd, a real nerd who was on top of the literature. The guy always had a huge briefcase with lots of books in it, shirt collar out, that kind of a guy. His sister wanted to be an opera singer—and she would like to be able to sing and record her voice and hear what she sounded like. So having read about and known about wire recorders, he knew they were to be had—they had problems with the wires, the reels tangling up and whatnot, so they weren't that satisfactory, but they did exist.

Well, Marvin became aware of a class of materials called ferrites, magnetic materials which magnetize very easily, get the idea of recording tapes instead of wire. The story goes that he learned to make these magnetic materials, and then to take ordinary plastic tape and put a coating of these magnetic materials on tape, and invented the tape recorder. Well, it had all kinds of ramifications. It made it possible, for example, to put sound on film. The talkie industry up to that time, the way talkies were made was the film had a little strip alongside the little frame with the pictures on them, and on this stripe different amounts of color would be recorded representing the light passing through a film of different intensities. So when you would speak into a microphone it would convert your sound into light pulses, and that sound would then go on a little smudge alongside of the picture frames, and that's the way you played it back, it would shine light through that and reverse the process. That was the way sound on film came about in the early twenties. But the dynamic range was low. You couldn't get very high-pitched sounds and you couldn't get very low frequencies, because there's only so many gradations you can get in blackening. It's not that sensitive to, say, be able to detect a change of one part in a thousand. One part in one hundred would be pretty good. But with the advent of the magnetic recorder, magnetic changes, you could change that by much greater—so the fidelity went way up. And Camras had many of the basic patents.

Wilmot: Fatality, you said? What did you say, what went way up?

Bragg: Fidelity.

Wilmot: Fidelity, okay.

Bragg: And also the—you could hear a pin drop, you know, a mosquito walk across cotton and stuff like that. So Camras was the guy who was constantly making inventions—as soon as you could think of an application, you could do it with tape, you see. It eventually became—well, eventually it became what we now have in terms of computers, except not quite the same thing. But the basic idea of magnetic recording is what did it. Certainly with the tape players that we have, things like that, he had tons of patents. In fact, it got to the point where they had a whole magnetic recording division of the foundation, that he was essentially the underpinning of the whole damn thing. Not that he went out and sold, because he was not a sales type. But that was one of the big deals that the foundation had.

I went to work in the physics division of the foundation. Magnetism by that time had become a part of the physics division. He had come out of the wire recorder division which was now essentially sales and promotion, and over in magnetism doing all kinds of experiments with eight-track stuff, and stereo, all that. He was a wonderful guy though, just as friendly as the day is long. But at any rate, I must have started doing, taking evening courses before I even went to the foundation, because I got hired there. I was hired there by Azaroff, which meant that a year or two after—very soon after I started working at the PCA recognizing my academic deficiencies, things that Copeland knew and I didn't know, or things that I wanted to know about x-ray diffraction that I had not learned at Brooklyn Poly. The thing at Brooklyn Poly was only a week long. One week's time, of course, it's eight hours a day or whatever. Nevertheless, that's a whole lot to be able to assimilate starting from scratch in a forty-hour week, which probably turned out to be closer to thirty.

So where do you go from there? Well, I learned a whole lot, because knowing enough physics I could read and teach myself. Nevertheless, the best way to learn a course is to get a good outline from somebody who really knows it. It's good if you can get him to teach it, because then you can augment what he says by your own reading. Or alternatively, you read and go talk to somebody. But the first thing I did, of course, was to go take—when I discovered that Azaroff was there—he had recently got his Ph.D. at MIT and was working at the foundation, giving this evening course, so I went to take that course. He gave us a follow-up course. I had a whole year of coursework from him. But having done that and then being encouraged to go for the Ph.D., I then jumped at the chance to work at the foundation, because now I could take any course they offered that was during the day or night.

First I was going at night, so I had to commute from Glencoe to Chicago and back again to the job. I realized that I wouldn't do that again if I ever had a choice. But those are the days that it was night and day working and going to school and being a parent and enjoying every bit of it. I thoroughly enjoyed the whole thing.

Wilmot: Your life was really busy.

Bragg: Yes, very busy all right. So that—

Wilmot: Was Violet still at home taking care of the children, or did she decide to go out and work?

Bragg: Violet, when the first—when the second—let's see, the first child was born—I don't know whether she went back to work or not. But certainly when the first—when the second child was born, which would be '53, she didn't work again until '59 or '60. I think for about eight years she didn't work, so it must have been after the first child was born, she stayed at home. So that was rather unusual then for middle class black families, because in order to live middle class, you're not earning enough money, you usually need two incomes. I was lucky enough to—I made more money than a typical white collar person in an office or that kind of thing made. But we didn't own our home then, and that was a source of a lot of unhappiness on Vi's part. She felt like I wasn't going fast enough. I remember, we'd have these experiences where one of her friends would, after years of saving and whatnot, they had finally gotten enough money and put a down payment on a home and invite us over, and then she wouldn't speak to me for a while. "They've got it and we don't. What's wrong with us?"

Wilmot: And your friends at that time, who were your friends at that time?

Bragg: Our friends were mostly people that I knew, like Charlie Stewart, who I had been a student with at IIT.

Wilmot: Right, I remember him.

Bragg: Who went on to get a Ph.D. in mathematics. John Haynes, who I had soldiered with, he was a very bright mathematician, we eventually became colleagues at the foundation. Not too many others. Some of the people that I had known before the war, we had just sort of grown apart, in fact most of them were women, so that would not have been a very good association. So I'd say we had a social life, but not an outstanding one. Well,

for one thing, Vi wasn't terribly social anyway. For example, going out, I felt like when people, when you wanted to go out, you don't abuse this, but you hire a babysitter. The only time we ever had a babysitter was when Vi's mother babysat. Nobody else was good enough to babysit our children. So it kind of put a damper on things. Living in Glencoe, all our neighbors, with one exception, were domestics. At that time Glencoe, Illinois, maybe had three or four thousand total residents. Jokingly, the people around there referred to the town as being composed of Jews and Arabs, meaning the white people were Jews for the most part, and Arabs were the black people.

The black people had been mostly domestics there. They were still for the most—practically all of them, cooks, houseboys, things like that. Butlers occasionally. But some families had managed to earn enough money to build fairly nice houses. That's how the house that we lived in had been built, by a family who had been domestics but had made fairly good money and wound up owning some land around there that they had houses on. But basically we lived on maybe two blocks in the whole town. Nevertheless, there was a little AME church there, Methodist church, that maybe seated 100 people. But all around us, with the exception of one family across the back fence—no, there were two—one was A.L. Foster, who at that time was the—either then was the executive secretary of the Chicago Urban League, or the head of the Negro Chamber of Commerce in Chicago. He had been a guy very active in the YMCA and things like that, the sort of guy that promotes black businesses. The other white-collar person was a medical doctor, I think her name was Dr. Love, who was famous for being an abortionist. That wouldn't be on her business card, but the scuttlebutt around town was that if you were—if an abortion could be safely made on you, Dr. Love was the person to go and see. She had a rather nice place there. They had rather nice homes. A.L. Foster was my back-of-the-fence neighbor. I never actually met Dr. Love, but A.L. I used to have conversations with, we would be out raking leaves in the backyard, and talk over the back fence. Occasionally he would have dinner parties and invite me over, and I'd meet interesting people from Chicago who for one reason or another, they might not necessarily be intellectuals, but they would be interesting characters. So that was Glencoe—

Wilmot: Glencoe, when you said it was two blocks, did you mean there were two blocks of the city that were occupied by African Americans?

Bragg: Not totally, but—

Wilmot: A small area.

Bragg: To be found on primarily just two blocks in that town. That's because it had been at one time the town was, certain parts of it were unincorporated. Unincorporated meant you could build just about anything you pleased within limits, as long as the county would agree to it. So these people, being domestics, weren't too keen on, weren't too swift about high construction standards in places they built. But apparently what happened was that a housing boom came about, and I don't know the details here, but the story is that you've got these unincorporated areas there that the city wants to incorporate, and they want to take over the land that these black people own. The question is, how do you do that? Well, they decide that the land has to be condemned, that the corporate limit is extended, and the land is going to be put into parks. So they need the land for these parks. Well, a couple of the people there were fairly savvy, so they went to

Chicago and got a very good lawyer who got an injunction against the city and compelled the city to build into their plans a certain number of parks, which turned out to be far more parks than any city ever needed. If you go to Glencoe today you'll wonder, why do they need all these parks? [laughs] Well, they're stuck with them, because having said they wanted the land for parks, and then being stuck with putting the parks into the plan, they had to go by the plan. So in a way they shot themselves in the foot. But some of the black people have managed to retain their property, and by now maybe some of those parks are gone. But while we were there, for a good fifteen or twenty years that I can recall, they had all these parks, and every time I would go through there I would laugh at them, "Well, it serves you right! You shouldn't have gone about it that way."

But most black people lived on two streets. There were white neighbors on both of these streets, but mostly they were black.

Wilmot: I have another question going back to your PCA years, as they come to me. You had described initially when you went to work there, you know, the whole discussion about basically the segregated eating facilities, dining facilities. I, just to get at this a little bit more, were there other black people who were working there?

Bragg: Who were professionals?

Wilmot: That's basically my question. And if not, what were they—?

Bragg: No, there were not. I was the black—the whole staff wasn't that big. Maybe a couple of other people. Degreed people, probably maybe twenty or so. The rest were either technicians, secretaries, things like that. But the point was that it was like the idea was to promote the family atmosphere, like one big family. People knew each other by their first names. A few people, a few guys would bring their bag lunch and just eat out in the powerhouse. Others, who might have had the same status in terms of job classifications, might come and eat in the cafeteria. But the fact is, that first of all, I think the highest ranking black out there who did anything other than janitorial work was the guy who befriended me, he was a technician, had been promoted from the pick and shovel detail more or less, brought into the laboratory working for a petrographer, a guy who studies rocks with an optical microscope. He was doing routine measurements on rocks, but he was classified as a technician, so Moody had had maybe a high school education, if that.

Wilmot: His name was Moody?

Bragg: His name was—it might have been Charles, but his name was Moody. He was my friend, he befriended me and put me on to the house that I got. Well, I don't know, I don't recall whether Moody ate in the cafeteria or not. He might have. But the point was, the practice had been, had evolved into no blacks eating in the cafeteria. And I'm really the first professional black to show up there, so maybe that was what raised the issue. But at any rate, the question was raised, and I was shocked at it. And this is now '51, it's not '44 or '45, back in New Guinea or the Philippines. So anyway, as I said, the act of demonstration on the part of the vice president and the structure on down really solved that problem, and I never had any problems of that nature as far as I'm aware.

Now, it is true that I discovered years later that another guy who was hired not too long after I came there from Northwestern, a white guy, who really was, if not incompetent, was not terribly bright, was earning more money when I left than I was, and nobody there would ever make any comparison of us as being of equal scientific contributions. He had come in earlier, I guess, because he was white, and he got higher and higher pay, and this issue hadn't got corrected in five years. So there was an element of racism there, or at least, whatever you want to call it. I'm sure the notion that I couldn't get another job had an impact on how much money I got paid.

Wilmot: When you were in the cafeteria, did you tend to dine with your teammates, people that—

Bragg: Basically, because you'd come down you'd quit work at the same time. It was a smart move on the management's part to have a cafeteria, even though the cafeteria wasn't very large. They were only serving 200, 250 people at the most. But where the lab was situated, there was no restaurant within a fifteen minutes or more drive of there. Now, if you take off and go off to a restaurant somewhere, it's going to take you fifteen minutes to go and fifteen minutes to come back, thirty minutes are gone before they even sit down to eat. So that's going to lose a whole lot of man-hours. So it makes more sense to subsidize a cafeteria, which the employer did, than to have people running off to go out to lunch. I've got to finish this one story.

Wilmot: You have to finish your story?

Bragg: Yes, about subsidy. Some guy finally comes to work as part of the lower level management, who has to watch the books on these things, and notices that people are not putting in money when they should at the breaktime. Breaks would come maybe at ten o'clock and two o'clock or three o'clock. You go down and take a break and get some coffee. Rather than—instead of people making coffee back in the lab, which we did of course, it was customary to have a break at about ten o'clock. I think we were due at work at around eight o'clock or eight-thirty, and by ten o'clock it was time to have a little break, just go down there and drink some coffee or tea, and maybe eat a piece of fruit. Because the staff of the cafeteria was very small, it only consisted of maybe one or two people, and the meals weren't all that varied either, but they were good meals—the company just had, for coffee, they just had a couple of coffee pots with some coffee in them and a can there to make change, you made your own change, there was no machine, and nobody—there was no cash register, in other words, it was an honor system.

Well, for any number of reasons, people might not have enough money one day, and instead of putting a coin in, would just say, "Well, I'm going to make up for it next time," and do so. And I'm sure that mostly happened. But this guy, this administrator, in going through the accounting, discovers that the cash box is in the red. How long that was, I don't know. But this alarms him so much that he puts in a coin-operated coffee machine. Nowadays nobody would complain about that. But we're in this family situation, presumably, where everybody trusts everybody, and who knows how much the difference was. Maybe it was small, or what. But it was the idea of suddenly being confronted with this coffee maker, this coin-operated machine, that insulted some people.

Now, it turned out that the machine dispensed a plastic cup which was very thin and very heat conducting, so you would practically burn your hand when you would get a good hot cup of coffee. But on top of that, a particular brand of cup they had at the time wasn't very well polymerized, so when you put some hot coffee in there you'd get a little odor of benzene coming out of it.

Well, my boss, being an organic chemist and a surface chemist, and a polymer chemist, knows that this is a lack of—this is poor polymerization, and these free radicals might have something to do with cancer. Well, that suggestion, and the anger that this mistrust thing generated, galvanized my boss.

Wilmot: This is Copeland?

Bragg: This is Copeland. [laughs] And I'm not sure how many others, but they were taking these cups, a sampling of these cups, and testing them for free radicals, free benzene, and it turned out that there was a significant amount of benzene that did come out of them. Well, that led to a boycott of the coffee machine, and people going off-site at lunch time. Well, you can imagine what happened. The machine disappeared, it was back to the honor system. So [laughs] without anybody going to management with indignation—[laughs] I'm sure the management probably asked, "Why is everybody doing this?" Well, it's because this guy, he didn't really understand what the total systems analysis would produce—had he done so, he would have seen that—what finally it turned out they were losing more money by having a machine there collecting every dime than if we had left it there and let a few dimes go away. [laughs] So that was the saga of the coin-operated coffee dispenser at the PCA. If I go there now I'm sure I'll find a coin-operated machine. [laughs]

Wilmot: It's interesting that they were kind of going with that campus-office type—office-campus kind of an atmosphere. Because people tend to think of that and talk about that, it's becoming very widespread with the Apple Computer and the—

Bragg: Well, it's interesting, you see, the PCA was a trade association, and not a very high-tech trade either. So you would have thought that they would have a pretty low-brow approach toward everything. But Dr. Bates was a real—if not an intellectual, certainly a very thoughtful man, who had operated at a pretty high level in industry at Westinghouse in a research laboratory, where they had top-notch people. So he had more or less set the tone for the kind of person and the attitudes that went there. So there was none of that waterfront attitude that you might expect would go with cement, it just wasn't there.

In fact, I had gotten used to being paid by the month there. In fact, when I went to the foundation I still got paid by the month, it wasn't until I went to work for Lockheed that I ever got paid by the week. It scared me to death. It means you're one week away from not having a job. [laughs] It wasn't true, but it looked that way.

Wilmot: Okay, well, on that note, let's end for today.

Bragg: Okay, good.

Interview 7: July 11, 2002

Wilmot: Good morning, this is July 11, interview number seven, Robert H. Bragg.

Bragg: Good morning.

Wilmot: Good morning.

Bragg: So we left off where, when I left the PCA to go to ARF, arf. [laughs]

Wilmot: With you going to the ARF. There are a couple of questions I had for you, and first I wanted to just ask you to—you had had some more thoughts about your time at PCA, and I wanted to ask if you could put those out there, and then I would ask you my other follow-up questions.

Bragg: I just basically—what I was thinking was, when I tried to sum up in my own mind what was different about things generally, me in particular and things generally when I left. The first had to do with what did I accomplish, that was an accomplishment. Practically all of it is in publications, of course, but the uniqueness is not too clear.

I had set up an x-ray diffraction laboratory from scratch, it didn't exist there before. And basically I had to do it with some help, of course, from sales people, but on the strength of a one-week summer course at Brooklyn Polytechnic, and lots and lots of reading. I hadn't even had a formal semester course in x-ray diffraction at that time. So having set up a lab for doing the x-ray diffraction—

Wilmot: I have a question about that.

Bragg: Yes.

Wilmot: What were your resources in doing that? You've described the reading, you've described your course. When you think about—I mean, was anyone else out there doing this?

Bragg: Well, the field, of course, was not exactly new. It was—after all, they had summer courses to introduce people to the use of diffraction techniques. These courses, they're still being given to this day in different places, maybe not at Brooklyn Poly anymore. But basically people who—physicists, chemists, anybody who is likely to be concerned with crystal materials or analyzing the structure of materials for whatever purpose to acquaint them with what it's all about, how to interpret the literature. And some actual hands-on experience in the laboratory doing, actually doing the work. Not a lot, of course, in one week's time, but it was a damn good course, I thought, and they ran for years at Brooklyn Poly. A lot of people got their start there, whether they stayed in the field from the physics point of view or chemistry, or biology or whatever. At any rate, that was a great start for me, because it opened my eyes to a whole new world that I—I hadn't even learned Bragg's Law when I was in graduate school, believe it or not. I don't know how that could have happened, but it was true.

Wilmot: Can you tell me a little bit about Bragg's Law?

Bragg: [laughs] Well, “that” Bragg happens to be not me.

Wilmot: [laughs] Okay, is this a law you made up?

Bragg: [laughs] In the early days, when x-rays were first discovered, very early the discovery was due to Roentgen, who discovered that x-rays were very penetrating—you could make them by having a stream of—very energetic electrons stop in any material. In this case it was first things like glass. But if the voltages were high enough, in other words the energies are high enough, a radiation would come out, which was invisible to the naked eye, but radiation could pass through material and it would blacken photographic films. It had many properties like this which are well understood nowadays, of course. Roentgen was the discoverer, and in a matter of a few days, actually, had worked out most of the basic phenomena that characterize x-rays. But it took a while before people realized that they were another form of radiation, very much like visible light, except much more penetrating.

Then one had to discover, next came the need to discover what the frequencies were. In the case of light, the concern would be wavelengths, like red, orange, and so on, different wavelengths. Then there was an experiment done in Germany in which a very important discovery was made—it's one of those moments in time when things sort of come together. The guy's name was von Laue, who realized that the people who studied minerals, on the one hand, had deduced that the spacing between atoms in crystalline materials, any solid material, were of the order of a few angstroms from a lot of different directions you could deduce that. An angstrom is 10^{-8} centimeters. On the other hand, these had been experiments in which you tried to measure, determine whether or not x-rays were wave-like, or particle-like. If you're wave-like, you would get diffraction phenomenon, a characteristic pattern that goes with that. The experiments that had been done seemed to indicate that the x-ray wavelengths that they were making in the laboratory then were of the same order of magnitude, angstroms. And if that's the case, then if you shine x-rays through a crystal material, then you ought to get a diffraction phenomenon. In other words, something that looks like diffraction, which was understood in the case of light, visible light, but in three dimensions now.

The classic experiment was done where a graduate student [laughs], of course, was sent to do the experiment. I think he failed the first time, but eventually shined the x-rays that they were making through a zinc sulfide crystal and got this fantastic pattern that consists of not just spots or smudges, not just smudges, but spots in very definite positions, arranged in geometric patterns. Then the question was, well, what does this tell you about the material that's—it must tell you something about what's inside the material. Remember I said earlier that if you want to study the interior of a material, you shine something in, and you see what it looks like when it comes out, and where it comes out, and how strongly.

Well, that led to a detailed theoretical analysis of how a wave of light would interact with atoms in a crystalline material. Crystalline means—it has a definite meaning—it means that atoms are arranged in a regular three-dimensional array, tri-periodic. Are we still on?

Wilmot: Yes.

Bragg: Yes. That means that—now let's take rock salt, take sodium chloride that you're familiar with, NaCl, Na for sodium, Cl for chlorine. That means that the sodium atoms and the chlorine atoms are arranged in a regular way, sodium, chlorine, sodium, chlorine, in a regular array in this direction, similarly in that direction and similarly in that direction. So it's tri-periodic. So now if you assume, set up the mathematics for a material which has this tri-periodicity and shine a wave of light of an appropriate wavelength into it, out will come a solution to this problem that has three conditions to it. They're called the three Laue conditions. But nobody really understood exactly what they tell you, how to interpret them geometrically. In comes Bragg. Bragg—now this is not in Germany. Bragg is in England. Bragg, there's father and son. They're from Australia, I think. The father was an expert on ionization chambers, which means if you shine radiation into this chamber, you can get a measurement of the intensity of the radiation that is coming into the chamber. That's how in the early days they could measure radiations like from radium and stuff like that that they didn't know what to do with, actually. But his father knew how to do that.

The son was, I'm not exactly sure what he was good at except he was extremely bright, [laughs] well trained. He got the idea of using the—of designing a spectrograph. What it amounted to was take minerals that you thought you understood pretty well, and now you shine x-rays onto a surface of this mineral in a very controlled way and see how the x-rays come out the other side. It's almost like a reflection, but it isn't quite. At any rate, what he arrived at from studying rock salt was what got him the Nobel Prize, that and one other thing, that there was a separate relationship between the wavelength of the x-rays, and the spacing between atoms in the crystal, and the angle at which the x-rays came out. This got to be called Bragg's Law, $\lambda = 2d \sin \theta$. If you say that to a scientist and he doesn't recognize Bragg's Law, he's not a scientist, it is just that famous. So, in fact, I get jokes about it all the time. When I tell somebody my name's Bragg, they'll make a joke about Bragg's Law. It happens that I actually work in the same field, [laughs] but that's just coincidental.

At any rate, Bragg showed that the three Laue conditions were equivalent to his law, which made it so much more simple to understand now. So that and the other thing was that since the arrangements of atoms in crystals are periodic, then there is a mathematics called Fourier series which is applicable, and so he saw that you could represent the arrangements, the location of atoms in crystals by Fourier series. And today, the whole science of, there's a whole branch of chemistry based on Fourier analysis of crystals, that all goes back to Bragg. W.H. Bragg and W.L. Bragg, I think W.H. was probably the son, and—but they both got the Nobel Prize together, it was about 1912.

Wilmot: So you're saying that you were just learning about all of this—

Bragg: Believe it or not—

Wilmot: —the learning curve was just—

Bragg: —I'm not sure, I don't recall having to learn Bragg's Law in undergraduate physics course. And even I had a modern physics course which dealt with nuclear stuff and so on, but I don't remember learning Bragg's Law. So when I went to Brooklyn Poly that was just a tremendous learning experience, just a whole new vista, “God, now I can

begin to understand crystals and really put to work all of the stuff that I've been learning heretofore."

Wilmot: When you were at Brooklyn Polytechnic, was this the first time you had been in Brooklyn, or—?

Bragg: Yes, the first time I had been in Brooklyn. I had been in New York.

Wilmot: Was that a very intensive kind of thing, or was there also time to go out and be in New York?

Bragg: Let's say it was—it was maybe not eight hours a day, but six hours a day of lecture and lab for five days. But there was still time, depending on how dedicated you were. I took my wife and our first child along. We were staying in St. George Hotel in Brooklyn, as I remember, because she had a sister who lived in Orange, New Jersey, close by, so she could visit her. It was nice. We stayed time over the—once the course was over we didn't come right home. So we did a little visiting around, mostly—and not so much in Brooklyn, a little bit in New York, went to Orange.

Wilmot: May I ask, were the other people in the class, were they also young—

Bragg: Rookies like me?

Wilmot: —young physicists from different corporations who were coming to get their preparation?

Bragg: They were, they were basically either young graduate students—and I was, for all practical purposes, would have been a third-year graduate student at that time—all people who had, for some reason, gotten into work in their jobs that made it useful for them to understand a lot more about crystallography than they knew. So it was a common thing to just spend some money—it is a good use of money—to send somebody off to a short course. I remember my—interestingly enough, Fankuchen, the guy who was the director of the—who headed up that program at Brooklyn Poly, his name was Isadore Fankuchen, Fan was known to most people, a very jovial kind of guy. Since I was the only black guy in the class and there was another guy there from Georgia Tech in the class, his idea of a good joke was to put us together, [laugh] as lab partners. Things are going to be interesting, to put this black guy with this cracker. It turns out he wasn't really a cracker, he was from Minnesota, [laughs] but Fan didn't know that at the time. He had somehow wound up at Georgia Tech and just stayed there, but he wasn't from Georgia. We were friends, yes, casual friends for the rest of our lives, actually.

Wilmot: You and Fan or you and Georgia?

Bragg: Well, both. Fan died, but Ray—God, now I've forgotten the guy's name [Young]. He's still my friend though, still calls me. At any rate, that was my "open sesame". That introduced me to the techniques, the kinds of equipment used, because Fan managed to get—he was a great hustler in terms of getting equipment for nothing by getting manufacturers to put equipment there so students could use it and want to buy it when they got home. And we did buy the equipment of one brand, it turned out to be a good

purchase. It was the strength of that experience there, coming back to the laboratory, getting with my boss, Copeland, and getting literature out, going around and visiting demonstration labs of the vendors, writing up the specs, and buying the stuff, and then setting and developing procedures to be used, testing for radiation safety. I learned. Every time I looked around I had to go and look up something, so I learned a tremendous amount that nobody was there to teach me, I just had to learn on my own from reading and in some cases just doing things.

But at any rate, when I left the PCA, I had set up the procedures that had become commonly used, in fact taught courses so people would know how to do it, not just “here it is,” but “come and I’ll show you,” and give lectures and whatnot. So I did that, and I left that in place when I finally went to ARF. I think I mentioned that in some of my first applications of x-ray diffraction to materials, first I would look at materials that I knew to make sure I knew how to do it, I know the answer. Then I went to things where I didn’t know the answer. One of the things that popped out was that I discovered that they had been doing experiments for years in which they tried to accelerate the rate at which cement hydrated by continually grinding it. You put the unhydrated cement and water into a mill that has got little steel balls in it, and you tumble the thing, the balls are continually fracturing the cement grains, and make like a powder, but it would be a wet, slurry-like powder. Well, they found that those rates of hydration in the ball mill were very fast, and they got a material which had a very low surface area. I mentioned earlier that you can measure the surface area of material by gas adsorption measurements, the BET method.

Well, from the BET adsorption method you would calculate an average radius of the size of the internal pores in the material, and that’s one of the reasons why they were doing it. These sizes turned out to be on the order of 100 angstroms or so. 100 angstroms is 10^{-6} meters. You can’t see it, of course. But anyway, the point is that whereas the cement that hydrates normally like we’re used to out in the street or in the house or—that had these high internal surface areas. But the material they were making by accelerated hydration had very, very low surface areas. They had assumed that somehow the two materials were the same, but clearly their properties were different. It turned out that when we turned our x-rays onto them, turned them on to x-rays, lo and behold the crystal structures were entirely different. So the chemical composition was the same, but the structure of the atoms that were arranged inside of the material were quite different. In fact, that wet—that ball mill hydration had produced a material which was a synthetic afuvillite. The mineral itself found in nature in some places in small amounts was called afuvillite, and we were making synthetic afuvillite, didn’t know it, of course. That wound up in a paper somewhere, I’m pretty sure, along with Steven Brunauer and Copeland probably.

But we also learned a few things about the basic crystal structure of cement from the experiments we did where we had accidental chemical reactions that produced a fluffiness, a rapid expansion of hydrated material that again, we’re getting back to layered structures, you see, which I had in my data bank when I left the PCA. And the small angle scattering, remember, I mentioned light scattering and the experiments we did with visible light. The sodium vapor light source is what I was using, has a maybe 5,000 angstrom wavelength, whereas x-rays would have wavelengths one angstrom. So this means a big difference in the scale that one could see with one technique as

opposed to the scale you can see with the other. The negative experiments that we did with the light scattering were what we should have found, they didn't tell us anything about the pore structure, but taught us something about precipitates in hydrated cement but not pore structure.

Well, we designed—again, with Copeland's leadership—designed a small angle x-ray scattering attachment. You couldn't buy an apparatus for doing small angle scattering at that time and for many years afterwards actually. Everybody built his own, more or less. We designed and built a simple conversion that we used, that I used for years wherever I went, rather than have to buy a special apparatus. If I didn't need anything particularly exotic I'd just make a simple conversion. Never did get published, incidentally, to this day. But that was pretty much the way I had left the PCA and my bag of tricks when I arrived at ARF.

Wilmot: Thank you for kind of itemizing that more clearly.

Bragg: [laughs] Okay.

Wilmot: I wanted to ask you, one thing is that you've mentioned working with Brower, Brower?

Bragg: Brunauer, B-R-U-N-A-U-E-R.

Wilmot: Yes, and I was thinking, I was wondering how much mobility did you have even at PCA, how much mobility did you have to—how fluid was it, were you able to work with him or was the only time that you were able to really work with him that time when you kind of near the end—?

Bragg: Oh, within the section, there it was organized into various sections. Ours was the basic research section, and we occupied one area of the laboratory. We had our own individual offices or labs, but it was a pretty loose situation. There was no physical isolation. Of course, my office was my lab. Brunauer's was his office, so he was higher on the totem pole, naturally. But there was no reason why I couldn't walk over and talk to him. But the secretiveness was because my boss was competing with—unspoken, maybe, but competing with Brunauer. So whatever we did had to come from him, not me.

Wilmot: That's what I was trying to understand, if that competition kind of inhibited your ability to get to kind of—

Bragg: What I did wound up in my lab notebooks, but my lab notebooks weren't being read by Brunauer, they were being read by my boss. So Brunauer, unless I told him of my research, he wouldn't know what I was doing. That's maybe a little bit too severe, because if he would come into the laboratory and ask, "What are you doing?" I would tell him that. But the implications of what I was doing I probably wouldn't have. So in that sense we were competing.

Wilmot: Can you hold on one second? And I guess another question I was trying to get at is during that time of an intensely steep learning curve where you were kind of availing yourself of whatever resources you could find to keep up, to become abreast of your

work, was there no one you could call? Did you have any colleagues or former students, classmates, or how—was there no personal—?

Bragg: Well, I am in an area—I understand your question, what resources?

Wilmot: Yes.

Bragg: I'm in an area where the technique that I'm using is not exactly new, but it's by no means as universally used as it is today, or as it was even twenty years ago. Very few labs had x-ray diffraction. It commercially wasn't a big deal. There were manufacturers, mind you. But the instrument that became the workhorse was called the diffractometer, a "meter" measuring diffraction—had just been invented during World War II. And in fact it wasn't much of an invention at the time. It was invented to enable people in the signal corps to orient crystals of quartz for oscillators. Oscillators were used to tune radio circuits. So it turns out the mineral quartz makes a very good, a steady frequency control device, by cutting it a certain way. You put electrodes on it and excite it, and it vibrates at a very standard frequency. You find these in watches or whatever you've got now, to this day, incidentally.

Then somebody got the idea, Well, if we do that, maybe we could just use—instead of having this fixed array, make it movable, we can study the whole thing. So that was the invention of the diffractometer. The one that we wound up with was probably the second generation from that, which was by then now beginning to the point where it would be commercially viable to have them. But in those days you had to depend more or less on an optical goniometer, because of the way light passes through quartz. If you shine light in different directions it has different properties, and those have been measured to some extent with optical measurements. But what you wanted to have is some kind of a way of mounting the crystal which comes not necessarily oriented the way you want it, and aligning the planes in such a way, the planes of atoms, that you could plane a right parallel to those, with high accuracy. The better you did that, the more frequency stable it would be. A mineralogist had learned just enough to understand that, arranged the setup like that that created industrial aligned quartz crystals.

So you can imagine that a lot of the properties of this new device were not understood. So a lot of papers are coming out in the literature, and I am reading these papers, so I am keeping abreast that way.

Wilmot: It was—in that sense then was this technology of x-ray diffraction, was that new to building materials like concrete?

Bragg: In essence, yes, in this sense. The use of—well, I'll give you an idea. You can use x-ray diffraction as a means of identifying materials, because every crystal structure has its own characteristic diffraction pattern, similar to the fact if you use a flame to vaporize material, it has a certain color, it gives off a range of colors. Another way of fingerprinting a compound, you might say. So you can use it for identification, that's qualitative analysis, say what it is. By controlling the amounts in various ways you can use it quantitatively, not only say what's there, but how much. So it had those possibilities. But the library of standard patterns that we have available today which runs into hundreds of thousands, practically, it didn't exist then. I think the Dow

Chemical company, they had, over time, because they had so many different chemicals, had in its own file for that industry, but you would not find an x-ray diffraction machine around a cement plant. In fact, at that time you wouldn't have found them around any of the research labs of the PCA companies except ours, because we represent a whole industry. And that was a big deal for us at the time, because we were just—that's really coming up to the twentieth century, you might say. It might have been—I don't know what was happening at Permanente, at Kaiser, that was the only one that didn't belong to the association. But yes, for the cement industry, in America that was new.

Wilmot: Okay.

Bragg: I'm sorry, did I answer your question?

Wilmot: Sure did, thank you. My next question now is about having learned this technique and this technology, was there a sense then that you could take it to other fields? In some ways you've spoken to this just now, but was there a sense that you could then, you personally could—there was mobility in that sense for you professionally, that you could go to another—?

Bragg: Good point, good question. I mentioned that—I'm not sure if I did it in the right order, but once I got back from Brooklyn Poly and I'm now confronted with becoming the expert based on a one-week course, I plunge into the literature, reading, and when I discover that Azaroff was giving an evening course at IIT in diffraction, which might have happened in 1953, '52 or '53, somewhere around there, I took the course, naturally. Azaroff took the point of view that he was going to give a course that was good enough so that you wouldn't be afraid to tackle any problem that involved the use of diffraction in studying materials, which was pretty ambitious, but pretty close to being right. So I learned first principles very well, and then I could adapt. Once you've got principles, then you can apply those to specific problems. So I was constantly doing that. It enabled me to read the literature and understand it, and in many cases to do things that didn't appear in the literature even. Some got published, and some didn't. Of course some things get published and it's not remembered that you did it, and your name doesn't get associated with it anymore. It becomes a part of the literature, and nobody remembers where it came from.

Wilmot: Becomes common knowledge—

Bragg: And if you say you did that, people look at you as if you're bragging. There's one case like that that happened to me.

But at any rate, I had a pretty good bag of tricks, bag of tools when I went to ARF. Also it was good to go there because first of all, I was in a more congenial environment in terms of my boss being the guy I had taken the course from, a couple of courses actually. At that time I hadn't settled on a Ph.D. with him, Azaroff, but he was my boss. I was in solid state physics, where I wanted to be, and now we could study crystals, that were more exciting to me than cement. Single crystals of cement are of absolutely no use whatsoever and nobody would—there was not much of a career going that route. So it was a step up in the level of sophistication that I was really hungering for, and I felt more at home, the lingo that we spoke, the kinds of people we dealt with were

improved. Except for guys like Brunauer, who was really great. But, well, Kantro was okay.

But anyway, instead of dealing with things that you made by the ton and by the boxcars, you dealt with things that you made by the handful. So I wound up in the solid state physics section of the Armour Research Foundation where years earlier I hadn't been able to get a job, after many trials actually. I would have to say that the reason probably was—well, first of all, Azaroff had come there, and he was the guy that hired me. If I had gone to the personnel office, I probably never would have gotten a job. But also, it probably was true that they had a program that it sold to a commercial sponsor that wasn't going anywhere. They had the money, but not much was happening on the program. It had to do with characterizing the defect structure of germanium.

Now, you have to understand that in 1956 the devices that we are familiar with today hadn't been invented. In fact, they weren't invented for another ten years, practically. But the transistor had been invented, in '46. By '56 electronic devices like rectifiers were being made by very crude techniques, and they were almost all based on the use of germanium, high purity germanium. And so, I don't remember which company it was that had this project there, but their project was sold on the strength of knowing how to analyze the defect structure of germanium, single crystals. Going from powders, which have virtually no organization, to single crystals, which are very highly organized.

Now, defect structure means the following. If you think of this periodic array of atoms in a structure, in three dimensions, and you interrupt this array in some way, for example, where if you're going from sodium potassium or sodium chloride and you pluck out a sodium, and now where there used to be one, should be one, there's not. There's a vacant position there, and that's a defect. It's called a vacancy, and it will have important physical properties. Or if you put a sodium atom where chlorine should be, that's another kind of defect. So there are a number of defects of this kind that occur in materials either naturally or can be induced. In fact, the whole science of materials modification is based on controlled introduction of defects in materials. That's when they have interesting properties, not if they're perfect. Usually if they're perfect they're not terribly interesting.

But at any rate, now I'm—let's say, I guess I had also begun to take courses in solid state physics in evening school. And now I'm in a solid state physics section, so this is great. I mean, they're doing stuff I'm studying, and—

Wilmot: There's real continuity between your—

Bragg: Oh, everything was just working out fine. I got put on this project to characterize germanium which required the use of an apparatus based on—. It sold a sponsor on the grounds that we could do these analyses with a special kind of x-ray source. The source was called a microfocus, micro- meaning small. But nobody had gotten the thing to work. Somebody had read a paper somewhere that said this is what you could do. The thing had been built, but nobody had ever made it work. And I did, I managed to harness it, to get it so that it was controllable, just by going to the literature and fooling around with the thing, taking it apart and putting it back together. And lo and behold, I got it working. Now I had control of that, now I could go do the experiments.

Well, that was pretty nice, because now that breathed life into the program. There was something to say whereas there hadn't been much to say beforehand. That led to an interesting experience. When I arrived, of course, I didn't know anything about this apparatus, and I had got to learn a lot about how x-ray tubes are built, and how x-rays are made. And also specifics about this kind of a source. So my first progress reports which were going to a sponsor have to be—first goes up to my boss, then to the sponsor. After all, you have to say what you've been doing with the money.

Well, I remember, it seemed to me that Lee, who was my boss then, had more or less asked me to put in some gobbledy-gook that would—

Wilmot: When you say Lee, do you mean Leonid Azaroff?

Bragg: Yes, Leo, he was familiarly called Lee. It looked like I'm being asked to do quick and dirty work. And I guess he's under the gun to produce results, and I don't think he had a shabby attitude, but it came down to me, it came to me that way, it seemed to me. And we kind of got in a shouting match, and I told him, "Listen, if I have to do that I don't want to work here." It was so loud that it was overheard by the section supervisor, [laughs] who in turn told the division director. (They're all young guys.) So I'm called down to the director's office, Len Reiffel. He said, "I hear you're having a problem with Lee." He told me what he had heard. I said, "Yes, that's true," and I told him what I felt. "Look, I don't do that kind of work." So he said, "Well, we don't want you to do that kind of work. It was probably a misconception," or words to that effect. "In fact, we like the way you've gone about things." I had gotten this equipment going, and nobody had. "In fact, we were so pleased that we're accelerating your raise." [laughs] So I had barely been there a month or two and got a raise. So that more or less set the ground. From that point on nobody ever pressured me about—not that they needed to, but—go ahead and do something just so you'll have—put some bullshit in a report. I never did that, and I never had to confront that problem again.

Wilmot: While you were at ARF.

Bragg: Yes.

Wilmot: Can you describe to me a little bit more this relationship with the sponsor? What was it like, who were sponsors?

Bragg: The sponsor was some industrial company that made germanium single crystals. I don't know who it was. But ARF was a contract research organization. There are a few of those, it's just like a big consulting company. It depends from the administration of the IIT, in other words it's non-academic, one of its non-academic dependents—I mentioned we had the wire recording, the tape recording division. Well, this was a foundation, not for profit, that was responsible to the president of IIT. We had the same benefits and things like that, but it's not academic. You do research not for profit. The idea is that during things like the war, World War II, these things had come into existence through getting contracts into universities for—practically none of them were ever immune from it, just had different names, but to do research for the air force, the navy, or the army, or whatever, and industry as well. So after you get the thing set up, to keep it going you have to go sell research, or have them come to you and they ask you to do it.

But the answer to your question about this particular sponsor, I don't know, I don't remember who it was. Except that they were making germanium single crystals, and they didn't know—for electronic purposes, which is what they were eventually to be used—what they were making. Hopefully they wanted to be able to correlate the electrical properties with the defect structure.

Wilmot: This sounds like such an interesting place to be because it meant you had your fingers in many different pies. It sounds exciting.

Bragg: Oh, it's lovely, it's great.

Wilmot: I'm wondering in industry, army, navy contracts, where was your work, what contracts?

Bragg: Most of the work in our section, and for that matter for the foundation, came from Wright Patterson Air Force Base. The air force procures a lot of research, buys a lot of research because it doesn't have its own research laboratories, and yet it needs to do research. So it does have a research arm, it's the Air Force Office of Scientific Research, but it's very small. Mainly they have scientists who are watchdogs to—who have ideas about what the service ought to be doing, and when you let out contracts for that, make sure that the contractors don't screw them, don't sell them bullshit. So the navy has the same, procedures, so does the army, so does NASA. All of the services do that, contract research, including having their own labs, they have outside contractors. Ours was a not for profit, and a fairly successful one, as I said, they had had licensing from the—the big patents were tape recording. But others, too.

Basically we would get contracts, the big sponsor, the biggest one by far was Wright Pat, in Dayton, Ohio. The typical contract would run two years. By that time you had just about learned what to do, and then it's over. [laughs] But the industrial contracts were fewer, in that industry tends to be—takes somebody else's results and use them rather than try to create new information.

Wilmot: Did industry then take military results? How frequently did that happen, as far as you know?

Bragg: Well, as far as I know—I couldn't quantify. But that's the heart of industry. [laughs] Very few—Bell Labs or GE Labs or HP Labs. The electronics industry got to be pretty good for a while because it was so far advanced and things were so new that you couldn't wait around for somebody else to do something, you would do it yourself.

But that was my first shot at ARF, and I did so well on that—yes?

Wilmot: In your eyes, from that perspective, from that very kind of—it sounds like it was a very rich place of—you were producing things. What were the most effective ways to get these technologies and research from, say military to the private sector—?

Bragg: I couldn't answer that, I know what you're getting at, it's called technology transfer.

Wilmot: Right, right.

Bragg: It's a process that we would have had little very contact with—

Wilmot: Right, that makes sense.

Bragg: —mainly because by and large the type of person that you use is different.

Wilmot: Type of person?

Bragg: Well, people doing research often don't make very good people doing technology. Researchers tend to want to keep doing research, but in technology you have to stop at one point and say, "Well, I know I would love to know more about this particular phenomenon, but to solve this particular problem, I already know enough to do that, so I'm not going to—" I ran into that at Lockheed later, incidentally. But I—in fact, I remember, in my senior year in IIT in physics, I became a member of the national physics honor society, it's called Sigma Phi Sigma. There was a kind of an induction ceremony, with feature speaker and whatnot. This guy was then the president of the society and at the same time I think an owner of the Central Scientific selling scientific apparatus. He asked, "Where does the scientist begin and the engineer end? Where does the scientist end and the engineer begin?" He said, "Well, if you don't know anything, you get a good scientist. But once you know something, bring in an engineer, because a scientist will keep doing science," [laughs] and it was pretty much the case. So that we would bring things to, hopefully to some conclusion, some result that [the service is needed], and if it meant exploitation, that we weren't good for that.

Wilmot: So then who was this—forgive me if you've already answered this, but who was that person who was that critical—in the engineering staff? Who took it over where you left off?

Bragg: Oh, it could be anybody. For example, one time Standard Oil Company came to our laboratory because they were interested in getting into radiation chemistry. Standard Oil, they had a big plant out in Indiana where their central research lab was, I don't know. But anyway, they came to ARF with a very sharp bunch of guys and we showed them our tricks, our muscle, we can do this, we can do that. Including in the chemistry division some guys who were doing radiation chemistry. In fact, I did a joint program with them on it. So basically they wanted to calibrate us to see—what they wanted to do was to hire us on an experimental basis, to see whether or not it was promising enough for them to get into it. But that meant some real money. The technology is ten times as expensive as research, so it was cheaper for them not to waste their money—they would rather spend some money to see whether or not it was promising before they jumped in, because if it wasn't, it was money gone down the drain. So it made sense for them to do that.

I remember this particular meeting where we all got up and did our thing. In my case I remember my particular contribution wasn't thought to be particularly useful. But at any rate the point is, your question is, the handover is usually done to a technology-based organization. Even in a large corporation like HP or whatever, or Bell Labs, the technology guys and the research guys are quite different. They know each other, but they do different things, and obviously there is some overlap. But basically, one has to make something work, and the other one is to find out why it works and so on.

Wilmot: What does it mean for your research, and maybe for our era at large, but what does it mean for your research in particular that the primary client was Wright Patterson?

Bragg: It means a paycheck. [laughs] Well, now that's frivolous, but basically—the university is supposed to be a service to society. And the presumption is that Wright Pat is an agency of the federal government, it has a mission that had society as its recipient. And so we're making a contribution, and we're providing the service.

Wilmot: I guess my question is more towards, what did it mean for the direction that your research took?

Bragg: What that did was simply to expose me to solid state physics at a more sophisticated level and a broader scope. Up to that point I had been concerned with calcium silicate hydrates and calcium aluminate hydrates, a very narrow range of chemistry and compounds and whatnot, and a rather mundane application. It was interesting scientifically in a way, but it was sort of stultifying. I'll say that because Powers, who was the director, who was a manager of the basic research section, was a man who had a limited scientific education, as I might have mentioned. Smart man, but didn't have a good deep background. He chose to look at the whole—at the thing that came out of the cement mill, the ground up clinker as a substance in itself. But it was composed of four major constituents, each of which to some extent has to affect the properties. So you're trying to study a mixture of four constituents, neither one of which you're exactly sure you know that much about. So the answers you're going to get out are going to be so rather vague, not very satisfying. It's much better to pluck them one at a time, look at their properties, and then begin to put them together one at a time and see how the properties change. That's the way to synthesize an understanding, not start with the complicated situation and try to narrow it down. Better to go the other way. But he maintained, "Well, cement is what we make, and that's what we have to study." Of course, I felt that, well, that's what we make, but we know that 75 or 80 percent of all of the properties can be understood if we take everything out and study this one, so why don't we just do that? And some of that was being done at the Bureau of Standards, I might add, so it wasn't that it was totally ignored. But his emphasis was on sticking with that material, and that I just felt was, you're never going to get very far that way. So it was a welcome change to—it was a good time to leave.

Wilmot: What's interesting to me is that when you shifted to a military client, it actually deepened your research as opposed to narrowing it.

Bragg: It did that on one hand, it raised the level of sophistication, but it also raised the anxiety level. Excuse me a moment. [interview interruption]

Actually, you raise a good question because I should have mentioned that at the PCA there really was a research environment, even though there were people there who were concerned with applications to cement plants and things like that. Now, the basic research section, we never had a moment's pressure that we've got to solve this problem because the mills is waiting to do this, there was never that kind of pressure. So I learned to do research where one concern about what we are going to be doing next year and if the money is going to come through, that never was a concern. So in that way I was very lucky, I could learn research, do the research at my own pace. For the most part nobody knew what I was doing as well as I was doing it. I knew, so with the exception of the meddling that I mentioned my immediate boss would do, basically I was on my own. And that was just wonderful. And I never had that experience again, I might add. So that part was good.

On the other hand, being with a very conservative trade association that didn't put a great store by science anyway, we were, I was, we probably all were underpaid, and I was grossly underpaid, obviously, because I couldn't have gotten those raises that I got unless I am getting paid eventually the market rate. So obviously I was underpaid. In hindsight that doesn't bother me a great deal. It doesn't at all, it doesn't bother me at all.

But the answer to your question was, we are in a much faster race now, things are moving much faster, and it does matter how soon you get an answer. Also, you're not certain you're going to be around doing this particular kind of job or this particular study long enough to answer all the questions that might occur to you. As I said, the average life of a contract, any one study, was about two years. And the reason for that is that the military has its objectives, its programs, its thrust. These are decided by an advisory committee, which is essentially the high priests who tell them what is good and what is not. They are basically bureaucrats. So they hire the smartest guys they can get, (they hope they have), from industry and academia. So this advisory committee would provide the basic thrust of the program. They'd say, "We need to know more of this, that, that, and that. This is not so important anymore, so either stop it or just tail it, let it simmer down."

So sometimes you could be in the process of doing a contract, find something that made more sense than what you were doing, in which case you might even get a variance to change it in midstream, or get what's called a follow-on, generate your own—in other words, dictate your own work from your own findings.

If you could do that, that was wonderful. Because that put you more in control of what you were going to be doing. But it could go either way. You could be doing great work, "Sorry, but we don't want to know that at the moment. So you do what you please with it, but we don't want it." But that early experience had the effect of getting me a quick raise, of course. My bones had been made, more or less.

Wilmot: I had one more question about ARF, and that is, who were your peer organizations?

Bragg: Battelle in Ohio, Columbus, Ohio. Battelle was much bigger than us, incidentally, ARF had maybe 1,000 people, Battelle had maybe three or four or 5,000 people. The Stanford Research Institute—

Wilmot: SRI?

Bragg: Yes, also Southern Research in Kansas City, a few like that.

Wilmot: Were there trade kind of meetings, or what kind of interchange happened between ARF and those peer organizations? Was it competitive?

Bragg: Yes, we all knew each other, in the same general field. The way you would meet up would be at committee meetings, let's say advisory committee to this that or that government agency, or professional society meetings. We're always constantly having meetings. In fact, if you don't do that, you can't keep up. So, but as organizations we didn't.

Wilmot: So did you have counterparts who were working on x-ray diffraction at other, at those organizations?

Bragg: Actually, I never knew my counterparts, come to think of it. There must have been. But I never did. They're essentially contract research outfit as well run by MIT. There was some work going on there that was similar to what I was doing, but the guy who was doing it, I knew him by name at one time, but never did meet him. [laughs] And it turned out that he didn't know too well what he was doing that particular project, because he essentially was following steps that were outlined in a book that had been written, and Azaroff caught it and wrote him a letter that said, "Here's what you're going to do next, right?" So it kind of, I think it kind of fizzled out after that. But to answer your basic question, you met people who were doing things that you were doing, wherever they might be, at society meetings, that's where I'd run into them. So you would get to know people, who was doing what, that way. There would be nobody doing any significant work unless they are under heavy control, that you would at least know pretty much what they were doing.

Wilmot: I think initially when we ended last time I had some questions about what the terrain was like in terms of other black scientists, and I wanted to ask you a little bit more about that.

Bragg: Pretty bleak.

Wilmot: Were there other—?

Bragg: At that time I saw myself as a physicist. That's what I am, I'm classified as that. I would go to meetings of the American Physics Society. I would go to other meetings which made sense with respect to what I was doing. The only time I ever saw a black scientist was when I would run into Warren Henry, who died only a couple of years ago at ninety, ninety-five or so. Warren was then at the Naval Research Laboratory doing research on superconductivity at low temperature and magnetism. And actually, his work was so good that you will find a graph of his data in every book on solid state physics you will ever pick up. I don't care whether it's in Russian or what. But it doesn't say, "Warren Henry, Black Guy" on it, it just says, "W.E. Henry." I would run into him, but he was a very busy guy, not terribly sociable. He was pleasant, but I can't say we ever got into any breast baring, he would say hi, he knew me, and we would wave and all that, but he would come in, give his talk, and go.

So basically, I didn't see black guys at meetings of the American Physics Society then. He's the only one I can think of, I know for sure I'd see him. By then I kind of knew who he was too, from other anecdotes, from work he'd done, like Tuskegee Airfield, teaching physics to the Tuskegee airmen. It was generally pretty lonesome in that regard. I just didn't have anybody to rap with, to talk shop with who was black.

Wilmot: Were you at that point the only black person at ARF?

Bragg: When I got to ARF there was a black guy who had gone to my high school, actually, who was a technician. His last name was Scott, I forgot Scott's first name [Maurice]. And I think John Haynes was up on the next floor in EE, he was a mathematician. He was a guy I had known from the army. And there might have been one over in chemistry

who had some low-level job, but basically John and I were professionals, I was the only black professional, and only the second black in the physics division, which had maybe 100 people or so in it. And John was the only one in EE, electrical engineering. That's why they had him because they had the computer and needed—as a mathematician. He wasn't an engineer but he was a mathematician. So there again, if you're looking for people to rap with, it just didn't exist.

Mind you, it wasn't irksome. Between being able to take courses and being able to teach myself, I wasn't all that much adrift. And I wasn't above asking questions if I needed an answer, I had no modesty or reticence about approaching anybody. All they could do is be nice or just say, “No,” or, “I won't help you,” which happened a lot. Happened—but basically pretty much what I would be doing, nobody else knew that much about it, around me. So the support groups and things like that that you think about today I just never did have, and I never did feel lost. Because as I said, I could always go to the literature, or if there was somebody I never saw, but I knew them by name, I would just write them a letter. After a while I got so I would just call them on the phone. [laughs] Sometimes they just wouldn't help you, but I never felt the need for an infrastructure. And this is a heretical statement, but a strong support group, I just never felt I needed it.

Well, the first success was the—

Wilmot: Sorry, one thing, you said you were the second African American person in your department?

Bragg: Yes, Scotty was—

Wilmot: Scott was first.

Bragg: Yes, Maurice Scott was a technician.

Wilmot: Okay.

Bragg: Yes.

Wilmot: Okay, great.

Bragg: The success I was having with this project that I was put on, and I think maybe even hired for, maybe the urgency of getting moving on that project helped to get me hired, I don't know, but this led to the formation of a group. The section supervisor saw fit to—oh, about the same time Azaroff quit to go teaching at IIT full time, just walked across the campus to join the IIT faculty instead of the ARF staff.

Wilmot: Why did he do that?

Bragg: Well, he was basically an academic-oriented person in the first place. He had gone to MIT, got his Ph.D. at MIT, and probably hadn't gotten an academic offer that he wanted, and so he got this job doing research at the foundation, they offered him a lot of money I'm sure. He enjoyed teaching though, he loved teaching. A good lecturer. And as soon as he got there he started teaching courses that weren't being offered by the regular staff. Then very quickly, because people in the metallurgy division use a lot of

diffraction work, he was asked to come and join the metallurgy faculty, and he did. So he did—taught, did the same things over there, but continued to offer the course over at the physics department. But at any rate, he went over to join the IIT faculty, and I moved up to his job then, so I took over his job. I don't know how this happened, but I became responsible for another program or two, so I wound up with a group of five or six people, responsibility for the x-ray lab and a couple of other programs. That situation was more or less what they maintained until I left.

I managed to do something that hadn't been done there before, and that is get up a contract from the Air Force Office of Scientific Research, which mainly funded research in academia. They rarely put money in industry, arguing that industry is too costly, which is true. The overhead is very high typically. And just generally, whatever they wanted done, it's more likely you're going to find somebody in academia who could do it quicker than you would somebody in industry. But on the strength of some very original thinking, based on some literature studies and work we were getting into, we got it because we had a nuclear reactor right there on the campus that was being built, and we didn't really know what to do with it, I wrote this proposal and got a grant, which was an interesting experience, because the way the military hands out money for research, they have a permanent staff, of course, who are civil service, and the officers get detailed in for periods of time, two or three years, and they go off and do something else. Well, this particular one, there was an officer who was in charge of the budget for this particular section, it had to do with chemistry. He got to thinking, "Gee, I wonder what would happen if you did this?" So it was the kind of thing that didn't have any relationship to anything the military was doing, but they had a certain amount of freedom to—you might say, do anything they damn pleased. Hopefully some of them might pay off.

So he wrote this request for a quotation, RFQ, to study the effects of radiation on catalysis, which is kind of far out, really. By this time I'm group leader and we've got projects going that I'm involved in. This particular one had to do with nuclear radiation. He doesn't really know what will happen but feels somehow radiation ought to affect catalysis. Catalysis simply means that if you've got a chemical reaction going, if you put in the appropriate catalyst, it goes faster. You probably don't change the end product, but you just get it faster. And catalysis is a big field. Catalysts are made by the ton, boxcar loads of it. Typically they are things like—well, it can either be catalysts like zinc oxide, or silica, or it could be clay, or—. But anyway, you put in—typically the reaction is made with hydrocarbons. With the introduction of the catalyst, the reaction goes faster for some reason, but these are not involving radiation, they just involve temperature and pressure.

Wilmot: Yes, radiation is a whole different—

Bragg: So the question is, in what way would radiation change things? Well, now this is an interesting problem, because I don't know [laughs] a damn thing about catalysis. In fact, chemistry is my worst subject. But I know something about solid state physics, and I'm learning every day. Well, the foundation's procedure were such that depending upon—RFQ that would come in, it might involve several disciplines. What would happen would be that you would borrow people from the various sections depending upon the team that you needed to do the research requested. But that would be decided by the people at the top of these sections meeting first, look at the proposal, scope it out,

“Here's what we're going to tackle this—” “Okay, Smith, you're in my group, you go over there and work with Jones and Brown, with those guys.” So once the division had been determined, then the heads dropped out of it, and the guys who actually do the work then constitute a team. Now, you might be half time on this project and quarter time on that project, you might be simultaneously a part of several teams. But anyway, that's the way the thing would be organized.

Again, depending upon the judgment of the—I guess the director, I forget who it was, but one section, one division would be the lead. Ultimately it's got to come through this division, all the other divisions are subservient to it, they contribute to it, they'll charge money from it and all that, but these guys are responsible for getting it done. Since it involved radiation, and that was over in physics where we had a nuclear reactor, even though it involved catalysis which was over in chemistry, it got put onto physics. Well, typically what you do is, once you get a proposal, a request for a proposal, you look at what it asks for and you decide, “How are we going to tackle this? Well, here is what we're going to do. Okay, well, you write the physics part, you write the theme, the chemistry part, you write the electrical engineering part, and come back with so many pages, and then we're going to put it all together to make it read like one person wrote it.” So these inputs are now coming back, and they have to be put into one nicely flowing story, that looks like you've got it all organized and ready to take off.

Usually the way the RFQs come out, you don't have a whole year to prepare them. You've got only a few weeks at the most before the proposals are due at Wright Pat. In fact, quite commonly what would happen would be that you would be working on a proposal, say it's due at Wright Pat on Monday night, and you might be working on that Monday morning, and there's a guy waiting until it gets printed, it's over at the print shop, [laughs] he gets on a plane, flies down to Dayton, Ohio, goes out, turns it—it's just that responsive to sharp, quick deadlines.

Wilmot: Yes, quick turnaround time.

Bragg: I remember this particular one because it was a very interesting one. The guy who was heading the reactor itself and I were doing the physics. I had worked with Brunauer a little bit, so I knew a little bit about, but very little. But I knew enough about chemistry to—well, I felt I could understand whatever they were doing, were saying. But when their proposal came back in it didn't look like anything. I mean, the stuff from chemistry looked awful. Just home, hearth, and motherhood. So we've got—these inputs come in on Friday and the proposal is due in a week.

Wilmot: What's “home, hearth, and motherhood” mean?

Bragg: [laughs] It means it doesn't really say anything, it's trivial! It doesn't respond to anything.

Wilmot: Okay.

Bragg: That's not a good answer, but it's like a filibuster. You get up and you talk and talk and talk and when you just sit down they say, “What did he say?”

Wilmot: Okay.

Bragg: Because, you know, it didn't say anything. Well, it didn't say anything. It said, "We're going to study some chemistry." No theme that went through it and whatnot.

Wilmot: That pertained specifically to the proposal.

Bragg: Yes. So when these inputs come in, and we've got to sit down and put this thing together. We've got typists standing—believe me, everything drops when a proposal has to go out because money, we have to have the money. So everything gets expedited. Whoever has to sign off can't go home, and so on. And Technical Publications is waiting over there to do the printing. And we look at this thing, and I remember Clint saying—his name was Clint Stone—he said, "What do you think of this?" I said, "It's shit!" [laughs] Pardon me. I might have used that term, but basically that was what it was was, it's nothing. It's ridiculous. He said, "Well, if you had to write this proposal, would you write it this way?" "No." "Do you have any ideas?" "Yes." "Well, look, let's come back tomorrow," tomorrow was Saturday, "and let's write the proposal that we think—they're not going to like it in chemistry, but we don't have time to educate them, and this is ridiculous. Nobody will buy this."

So it turned out that I had been, as I say, reading, reading, reading, reading, reading, and had some ideas about how radiation might affect the catalyst material itself, how that would change the material's catalyst properties and how that would change catalysis. So the idea was to pick a catalyst and a chemical reaction whose dynamics we could measure and then put this in a radiation environment and see what happens, if we could predict which way things might go and so on. So when—that Saturday we came back to the office and everybody is gone. We sat down and we wrote the proposal and sold it.

Wilmot: So you became a chemist. [laughs]

Bragg: My worst subject. [laughs] Well, it didn't get a chance to get back for their review, so it went out, but it sold. And these guys were furious. "What do you mean! This is bullshit!" They found all kinds of reasons to complain about what we had written. "This is not chemistry—no, it's not chemistry, it's physics." [laughs] But I remember when, the first time we met to divvy up the money, meeting with the two catalysis experts in chemistry, one of them became so furious he almost called me "nigger." He was just that irate [laughs] and I was ready to punch him out, too. So they got him out of there, removed him and replaced him with a guy who was more of a pacifist, Fred Morris, I forget the other guy's name. After all, we do have the money. [laughs] They can't do away with it. [laughs] But we got along fine. We've got the grant, and now we have to decide in detail what to do about it. Well, the ideas that I had come up with involved the effect of radiation on—well, the reaction we wanted, were going to look at, was the hydrogenation of ethylene. Hydrogenation simply means you add hydrogen. It's like if you take cottonseed oil and you hydrogenate it, you get Crisco. You take something which is fluid and you add some more hydrogen to it, it is solid at room temperature. Roughly that's an idea of what hydrogenation would involve. That particular reaction we chose was pretty well known and studied over, zinc oxide as a catalyst material, in considerable detail.

So we knew pretty much what to expect if you didn't have any radiation, except that the electronic factors in the zinc oxide hadn't been studied. Nobody knew what would happen. We had some ideas what would happen, but we didn't know what would happen

when you subject the zinc oxide to radiation. The whole thing was to be put into a bomb, which we then would then put inside the nuclear reactor, and turn on the radiation. So it involved radiation chemistry, and physics of course, nuclear physics. It was a nice—everybody would have a little fun with that.

Wilmot: [laughs]

Bragg: Well, we did some experiments on zinc oxide. We didn't know anything about zinc oxide so what it meant, of course, was we had to learn from people who did. We didn't have time to do a lot of writing, but instead visited people who had studied zinc oxide single crystals. I went to Bell Labs, and there was another guy who had written a book on electronic factors in catalysis at Alfred University in New York State, so I went up to see him. He turned out to be a big four-flusher, but that's another story.

Wilmot: What is a four-flusher?

Bragg: Well, a lot of hot air, someone who is not technically very solid, grounded, but a big promoter of his ideas. He had even written a book. We also got involved with this one guy over in the chemistry, Paul Feng, a radiation chemist, who was very good.

Wilmot: Paul Feng?

Bragg: So out of it they managed to get a couple of publications. I don't think we did, come to think of it. But it turned out to be a very good program. We found out that when we switched on the radiation the reaction sped up, and when you switched it off it came back down again, and this cycle could be repeated. But the catalyst, after a while it got poisoned. Now I could understand all of it, but I didn't understand all of it then. But that turned out to be a very successful project. As I said, they were just furious when we discarded their input, but it was such crap.

Wilmot: Did they own that it was crap?

Bragg: Well, no, they said at the outset that what we were writing was nonsense. But it wasn't true at all. They simply were back in the stone age as far as solid state physics was concerned, that was the problem. We didn't know that much about catalysis, but we understood solid state physics, and we understand what happens when you irradiate catalysts. So that left us to struggle with the electronic factors in catalysis, which would be the proper place to look, actually. So it was good. And we are better off as a result of it than if it never had happened.

But their first reaction was that, "You guys are not—you don't know anything about chemistry, so—" That was probably one of the most interesting ones that I worked on while I was there. But I worked on others, did experiments where we took germanium and put them in a bomb and put them in a reactor and pressurized them. The idea is that if you want to produce a defect in the material, one way to do it is to shine an x-ray—I'm sorry, to shine neutrons, to pass neutrons on it. You can imagine, you have a material and you've got all these atoms in it, here comes a very energetic neutron in, well, it can knock some atoms out. It's called a knock-on.

Wilmot: Knockout?

Bragg: Knock-on. If the material was rather thick then atoms may not come out the other side, but they will still be rearranged inside, because there will be a disturbed region in there, so the electrical properties will change, and the structure will change locally. So that was the essence of what the radiation effects were concerned with. So we learned some things about the effects of radiation on zinc oxide for sure, and other materials as well.

But back to germanium, rearranging one atom—if you put one germanium atom here and replace it by one over there, it won't make any difference if you only do that, because they're all the same kind of atom. But if you change their locations, then that will make a difference. So the idea was to look at the effect of pressure. The idea that is if you squeeze them together tight enough, it's going to be real hard to knock them out. So that meant I had to learn something about pressure, how to make a bomb—or rather what kinds of bombs, how to pressurize it, how to do the experiment that is called in-pile, inside the reactor. That was novel, but we picked the wrong material to do it. I still think it was an interesting experiment, never did repeat it though.

Wilmot: When you say bomb, do you mean like weapon? When you say bomb?

Bragg: Weapon, bomb, no, what you mean is a container which you can isolate from the outside. Exactly why they call it a bomb, I don't know. I should look that up. But typically it would be a container made out of steel, like a cylinder, with a cap on it, and you can put stuff in it and close it up. And maybe have one pipe leading into it that you could pump air or fluid and increase the pressure, or reduce the pressure or, pump it out for that matter. So a bomb is essentially that.

Wilmot: It's a different use of the word than weapon.

Bragg: Yes, that's not a weapon at all.

Wilmot: Okay, I just needed to check in with you about that.

Bragg: No, no, no. [laughs]

So that, we did some experiments on trying to activate scintillators. A scintillator is a—S-C-I-N-T-I-L-L-A-T-O-R, scintillator. The idea of scintillation is this. You perhaps have had the experience of going into a physics demonstration in a darkened room and see lights flashing where photons or x-rays or gamma rays are hitting a zinc sulfide screen and you see these little flashes of light. But basically what it amounts to is that with a scintillator, if you shine a photon on this with the appropriate energy on a photon—on a scintillator—it gives off a little burst of light. And so to count the photons, which you can't see, you connect the photon to the light, which you can see, you use the scintillator. It's used for various purposes, photon counters is the most common one. But your TV phosphor is one, TV screens are scintillators. They're rather exotic, but basically they're scintillators. Electrons in your TV tube hit the screen and excites light of different colors and so you see television.

So studying the phosphors was—they're called phosphors—or scintillators, was interesting. We were trying to see if we could activate them, without going through complex chemistry, if we could activate them mechanically. We were mildly successful at that, didn't stay in it long enough. And we did some work on what are called color

centers, or F centers. An F center is a technical term, F meaning Farben, I think it is, in German, but it's color center. The best example I can think of is potassium chloride. Take a single crystal of potassium chloride, if you put an F center in that—an F center is just a defect that's where there used to be a chlorine atom, you've taken it out but putting an electrical charge there. And this electrical charge acts like a little light bulb, when you look at it you see a beautiful lavender color. So you can additively color them, you can do it with x-rays or gamma rays. Rock salt, ordinary table salt turns out a dirty reddish-brown, depending on the material you have different colors, so it's a rather interesting field. We did some work on that.

But somewhere along the line I got to the point where—I'm making more money all the time, I'm being very successful in getting work done, but I don't have time to go and finish up my dissertation. By this time I've just about done all my coursework.

Wilmot: So you consistently always, all these five years, you've been taking—

Bragg: I'm taking courses and all that, and I've just about done everything, but now I've got to write a dissertation. But in the meantime they're paying me more money, and rather than my working on it—I can't duck off sometime now and go do some of my own work, I'm constantly worrying about the work that I'm getting paid for. And that disturbed me so much that I went to see the director, told him, “Look, I'm getting concerned that I'm not going to finish my dissertation.”

Wilmot: Who was your boss?

Bragg: By that time my boss was Jon Buttrey, but he isn't the guy that I went to, it was Leonard Reiffel, who was the director of the division, Len Reiffel, Leonard Reiffel, R-E-I-F-F-E-L. Reiffel was a young guy—younger than me, a very dynamic guy. He said, “Well, you know—” I said, “If necessary, I'm going to take a leave so I can finish the thing.” Now I'm almost forty years old. Yes, forty. He said, “Well, look, why don't we do this. We have some independent research money, in-house money. We'll give you a grant to finish your thesis. In other words, we'll pay for your time to take off and finish your thesis.”

Wilmot: Great.

Bragg: So he did and I did. It wasn't a terribly good dissertation, in my opinion, but the main thing I learned in the dissertation was I could teach myself the dynamical theory of diffraction which I hadn't learned from Azaroff. And at that time not many people understood it. But in order to understand what I was doing I needed to understand it. It turned out that the only book in English at the time that had a detailed derivation of the theory was given by a guy named Zachariason, whose book was so short that—it was so concisely written that you daren't miss a comma. He was once asked about the length of his book, how short it was, he said, “Well, if I had had more time, it would have been shorter.” In other words, a lot, most books are written with far more detail than they need in order to get across. There's a lot of redundancy.

But at any rate, what I was seeing in studying germanium single crystals depended upon where in the crystal I would shine the x-rays, the intensity of the x-rays coming out would be quite different. Now, from reading that I had done way back in the early days

of the field of x-ray diffraction, when a detailed theory was first worked out—that there were two basic theories. One was got to be called the dynamical theory, and the other was called the kinematical theory. The kinematical theory and the dynamical theory agreed in terms of the geometry of diffraction, where the beams would come out, the results were the same. But the intensities these predicted were quite different. People then began to study naturally occurring minerals, because they were convenient—you've seen these rock, gem displays, nature produces some very perfectly formed crystals. Nevertheless, if you took rock salt crystals from various places, you could find that the intensities would vary anywhere from being that predicted by one theory or the other one, or somewhere in between. So the question, well, what does that tell you? Why is that? Why would the dynamical theory be applicable and not the kinematical theory?

Well, in the work that I was doing, remember I told you I had managed to tame this microfocus apparatus and I took on the study of germanium single crystals. I could arrange to shine an x-ray beam at different points of the single crystal, which would be part of a bigger crystal that had been grown for use in making devices. What I found was if I go near the edge—think of it this way. Think of a milk bottle, which has got a neck here and a circular form. This is the shape that a boule would have when you pull it. A boule is simply a solid material that is grown from a melt; you have a crucible, put some molten silicon in it or germanium, and you dip a small single crystal of germanium or silicon into this melt and start to cool it. And as you withdraw it, slowly it comes out shaped like a cylinder, but it's one big single crystal, and that's the way it's grown to this day. Except instead of being one centimeter in diameter, they're like a foot in diameter. It's a difference in technology, improvements.

So if you cut a section through this perpendicular to the long direction, the ends of this section would represent the outside of your boule, and the center would represent what's inside.

Wilmot: How do you spell that?

Bragg: Boule? B-O-U-L-E.

Wilmot: Thank you.

Bragg: What I found was that if I—how to put this? If I took one wavelength—oh, back up. With this technique I could take a source of x-rays which emitted a spectrum of wavelengths, and by using Bragg's Law I could isolate a single wavelength, and now I could change the observed intensity of that by an order of magnitude, say from one to ten or something like that. If I now studied the intensity of a scan across this slice that I've mentioned, say if the wavelength was very long, then the intensities near the edge would be very high and very small in the middle. But as I made the wavelengths shorter and shorter, the intensities were about the same. What that demonstrated was—what the real contribution of this study was that you could either get the material appear to behave like either the kinematic or dynamical theory, depending on the wavelength I used. And the theory says that. So in a way, although I tended to denigrate my dissertation, it really wasn't bad, in hindsight.

Wilmot: Confirmed—

Bragg: That I could demonstrate the wavelength dependence of the intensive response going from the kinematical to the dynamical case. I don't think I wrote it up quite like that, incidentally, I just demonstrated the effect and some other things about quantifying my particular experimental technique which had been invented but never much used before, and never much used afterwards, I might add. But it got me my Ph.D., and I might add that—well, one thing, just before I got my Ph.D., I had come up to my qualifying exam. And I had done pretty good, essentially dean's list—but that's not impressive in graduate school, I mean, everybody is getting A's, or B's, I'm getting A's. And I'm feeling pretty good. But when I got to the qualifying, the written exam I did perfectly. To prepare for it, I took a month or something like that off from work, moved out of my house. By now we have two children. Moved to the YMCA in Chicago, and I'd just go home on the weekends. I'm studying like from the time I could get up till the time I would go to bed, stop for meals or walk, get a little exercise. But I knew more about more subjects than I ever did before or since. I really was hot by the time I had gotten ready to take the written exam.

Not only that, it turned out that one of the guys who was contributing to the exam was a real son of a bitch. Here's a kind of guy who is going to ask you questions that you will not be able to answer on an exam. I don't care if you're smart or not, you just won't—they're tricky problems, and you won't be able to answer them. So what you need to prepare for him is to just go and look up as many tricky—and they are mostly going to be classical ones, he probably didn't invent them—look up the short way, if you really understand the trick on answering these questions and be sharp on that, because you should have seen them. There was one in particular I remember, this guy is sure to ask this question, because that's the way his mind works. And sure enough, he did. Of course, I aced it, naturally. [laughs]

There's a set of little monographs that Cambridge University in England put out on physics. It contains a lot of examples like that, and I just went through and worked them all out. So [laughs] I understood them. The guy, he finally asked me, "Did you—how did you do that?" I said, "I don't know, it just seemed that ought to be the way—." I never let on that I had prepped—but he got me. I got him—he didn't get me on that exam, the written, but when it came to the oral, he asked me some questions about solid state physics that I didn't answer, I couldn't answer.

Wilmot: Hmm, and that was your field.

Bragg: Yes, and they were basic questions on one aspect that I had never studied, it had to do with mechanical vibrations in solids. They were simple enough that I could have learned the answers to those in a matter of days, two or three days, but I had never had that coursework. What that showed, what that came from was a sort of a polyglot approach to teaching solid state physics, that was the state of the things at that time. The textbooks that we have today, which are pretty well classical, didn't exist then. So what you learned pretty much depended upon what you had been taught or had access to. It wasn't a question of my being incapable of learning the subject, I didn't know a thing about it, and had never been taught anything about it. It had never come up. So on the strength of that, I flunked that part of my qualifying and was recommended to take a course, even asked to pass it with an A, [laughs] which I did. But it was good. I mean, far from being angry about it, I was kind of pissed off at the time, but my advisor had to agree, "Well, look, you didn't know it, after all." [laughs] So it was good for me.

Wilmot: I have some questions for you.

Bragg: Yes.

Wilmot: So this whole time that the ARF kind of gave a grant to get ready for attaining your Ph.D.—

Bragg: Yes, to do the laboratory research. I had done all the other stuff, yes.

Wilmot: Yes. And that was how long again?

Bragg: You mean how long it took me to—?

Wilmot: How long was that time that you took away from work and—?

Bragg: Oh, I didn't actually move, I just—what I would do would be to stop work at different times during the day and go into the laboratory, use their facilities.

Wilmot: Okay, so you stayed on, you didn't—

Bragg: Same place. The leaving home, all that did was to bone up for the qualifying, the oral. I'm sorry, the written.

Wilmot: And so that—how long was that stretch?

Bragg: Oh, it must have been altogether six months or something.

Wilmot: Six months in 1959?

Bragg: See, because over time I had already made a lot of strides, a lot of what went into the dissertation I had learned in connection with this commercial project, so I didn't have to do that again.

Wilmot: And your dissertation advisor, would you tell me—?

Bragg: It was Lee Azaroff.

Wilmot: That was Azaroff, that's what I thought. What kind of role did he play as your advisor?

Bragg: Cheerleader.

Wilmot: Cheerleader.

Bragg: Lee didn't know a thing about the dynamical theory. He knew it existed, but he was basically a crystallographer, a guy who worked out crystal structures. And to some extent crystal physics. But he had gotten his Ph.D. working for a guy named Martin Berger, at MIT. Berger was a crystallographer who worked a lot of—worked out the crystal structure of many minerals in the early days when these weren't known. His claim to fame was that he had taught geologists or mineralogists the importance of crystal structures. He also invented a certain kind of a camera to make intensities easy

to measure. The point was that all of that was part of Lee's background, and even the lecturers at MIT, the most famous of course was W.E. Warren, who was kind of the godfather in kinematical theory. Warren never taught dynamical theory. So all of Lee's education had involved kinematical theory. So there wasn't very much he could do for me in dynamical theory, you see, so I had to learn that for myself. I count that as one of my accomplishments, actually, to read Zachariasson's book and understand it. It wasn't that difficult, but it—you had to read very carefully. I found maybe—I found a comma or something out of place once, but to go through a whole book and find no mistakes, that's pretty hard.

Wilmot: Well, so I just wanted to ask you, and you've talked about this somewhat already, but then how did you choose that this was the right topic area for your thesis, how did you decide that this was the one you needed to—?

Bragg: First of all, I was already in diffraction, I liked it. I was very successful at it so far. And it applied to everything. For example, there are some guys at Berkeley who pretty much claim that you can tell them the atomic number of the elements that you are looking at and the structure. First of all they'll tell you whether or not there can even be that structure, or the other way around, calculate all the physical properties, just with lots of computer time, but in principle you can do that. So everything starts with structure, or for that matter, even defect structure starts with structure. So it's so very fundamental it applies everywhere. I could be in a metallurgy department or a chemistry department or a physics department, I'd fit anywhere. And that turned out to be the case the rest of my career.

Well, the reason for picking the dynamical theory was that [laughs] I had to understand these intensity differences. Why should—it's all the same material, why would the intensities be different if I go there as opposed to there. So it was natural to want to dig in further and try to understand what I'm finding, and that's what led to just digging in right there. I already had everything set up to do the measurements, not that I had them all done already. But now I knew—I had guidance of what to measure and what it's telling me.

Wilmot: You told me this interesting story about how Azaroff had tried to put you in touch with a physicist named [Percy] Julian.

Bragg: With what?

Wilmot: With a scientist named Julian?

Bragg: No, that wasn't Azaroff.

Wilmot: Oh, sorry.

Bragg: No, my thesis advisor for my M.S. was different from my Ph.D.

Wilmot: Right, okay.

Bragg: It was Francis Yost who put me in—he didn't actually put me into touch with Percy Julian. He wrote Julian a letter—in fact I've got a copy of it, I looked it up the other

day—asked him if he would consent to see me, would just talk to me, to encourage me. I never saw the response, but he told me that Julian comes back to him and says, “Yes, I’ll talk to him, but I’m not going to give him a job, or—” Very negative. It pissed him off. “Who does he think this is?” You know. He didn’t ask him to give him a job, just to talk to me. And that’s true. He might have—in hindsight, of course, I’ve thought that probably Julian felt that—and in being a rare bird at that time, he is the black scientist, he is George Washington Carver practically—nobody else of that stature around, since Carver you might say. Well known, his name in the papers, he synthesized cortisone and all that.

So he’s probably getting requests from everywhere. You know, as you get older you realize that you can—you won’t have time enough to respond to all the kinds of requests that you get from people. So I’m not sure how unique mine was and, of course Yost thinks it’s very unique. [laughs] But Julian was probably just saying—I’m not sure why he would have to put that in there, but he’s saying he is very busy, and don’t expect a lot. I don’t know, I’m not sure I would have done the same thing, but I can kind of understand how he might feel, “Well, look, you’re his thesis advisor, you should be helping him.” Well, he thought he was helping me. He had tried to get me a job at the navy in Washington, but it required security clearance, I might add—after all these security things came up—I kept in touch with them, but when I ran into security problems and they said, “There’s no point in applying here, it’s worse here than it is where you’re gonna go.” [laughs]

Wilmot: I have a question also about your family during this time. At this time your children were—they certainly were becoming school age. I wanted to ask you what kind of choices did you and your wife make about where to send them to school?

Bragg: The initial choices were simple, they went to school right where we lived. We lived in Glencoe, Illinois. My son was, oh, four or five months old when we moved to Glencoe, and of course he grew up there until we left. And my daughter was—Pam was born in a hospital in Chicago, but essentially was born there. Well, Glencoe, Illinois, is a ritzy suburb, if not like Lake Forest, it was still considered upscale. The typical Glencoe resident was white, probably Jewish, worked in an office downtown, went to work on the suburban commuter train. And they had maids. And the black people from there were the domestics who serviced them. So you can imagine the quality of the school system. I don’t think we—nobody would think of sending their kids to a private school there, because the public school was—represented the affluence of the people who lived there. And of course, the black kids who happened to be there benefited. But it never—the question about quality of school never came up, because it was already clear that what we were going to find was an outstanding public school system.

It would have been the same if we had stayed there until they went to high school, because the public high school that they would go to, New Trier High School, it was famous the world over, practically, for the quality of high school education, like going to college.

So school choices were not an issue until we moved to Chicago in 1959 to—this may be a little bit off the point, but to give you an idea about what went on around there, at one point my wife began to have serious emotional problems. And her pediatrician was a Jewish guy who had a sister who was on the board of a nursery school whose name I

don't remember, but an expensive one. But she was on the board, and so she got a scholarship for my son to go to the nursery school, to alleviate some of the stress of an active young child. In fact, the tuition at that school was more than the tuition I was paying [laughs] to go—my college courses.

Wilmot: To get your Ph.D.?

Bragg: You won't know this because you've probably never even heard about it, but there used to be a TV program called *The Romper Room*, and Miss Frances was—the programs that you see now, the children's programs that you see, they all came from that program. That was like a pilot program, that made fun out of nursery school. So Bob had the experience, had the advantage of going to a very upscale nursery school where they would come and pick him up and—no, no. They rotated the pick-ups. They would pick up two or three kids one week, and then the next week somebody else would do it. So to answer your question about the school system, it was exemplary. We couldn't have afforded anything—if we had lived in Chicago it would have been totally different. As I say, that went on until we left, because they were still in elementary school when we left Glencoe to move to Chicago.

Wilmot: Were those schools integrated schools?

Bragg: Oh, yes, yes. Glencoe was a funny town in that—this is now like '56—I'm sorry—it's more like from '51 to '59. We went there in '51, we moved to Chicago after this, we were there about eight years.

The people who lived there were mostly Jewish, a fantastic synagogue there and all that. There were some gentiles, of course, but mostly Jews. A sprinkling of black people who were almost all domestic except myself and one or two other people that I might have mentioned, A.L. Foster was one.

But because of the liberal mentality of the Jews, at that time at least, in that place, at the level of the pre-adolescent children, they made no racial distinctions. Everybody went to the same—if they were school age they went to the same schools. Now, they might not have fared as well academically because of other factors, but—. And sleeping over, that kind of thing, my kids grew up sleeping over at white kids' houses and vice versa, so that in many respects the reality of the black/white dichotomy that existed in the world a few miles away just never hit them [laughs] until we moved a few miles away. In fact, it never hit there at all. Had they stayed there long enough—when the boys' voices began to change and the girls began to reach puberty, that's when the boom lowers, because now the parents begin to discriminate. The black kids no longer get invited to everything, or get invited at all, or don't even hear about it. In other words, they discover that there are blacks and whites, and they plainly don't meet. That would have been the situation then. But we weren't there long enough for that to hit.

As a matter of fact, one reason why we moved from Glencoe to Chicago was one time my wife happened to say she thought she might go back to work. My son said, "What are you going to do, Mama, be a maid?" And the reason why he said that was that he had never seen a black woman—by now he could recognize the difference between black and white, although he doesn't [laughs] really think he's black. But he had never seen a black woman in any capacity except domestic. He had never seen a black

salesperson, he had never seen a black schoolteacher. All the black people he knew who worked on a job—now, he knew I was a scientist, so he didn't think of me as having to be a janitor. But black women, all he ever saw were maids in people's homes, or cooks. So it was a natural question for him to ask. But when I heard that, that really got me. I realized that there's something wrong with this picture, it's not a good picture. He's coming up with the wrong impression about the way life is. And it's not a good place, really. It's idyllic on the one hand, but it's bad on the other, and it's likely going to have a serious downside. So that kind of made me determined to leave.

Now, it didn't happen like that right away, but it certainly predisposed me to move. And for another reason, that was, I got tired of commuting.

Wilmot: Were those your primary reasons for moving, why did you—?

Bragg: The commute and the racial thing.

Wilmot: And then you decided to move to Chicago?

Bragg: Chicago, because although we had moved there in '51, I changed jobs in '56, but I didn't change houses—still living in Glencoe in '56, but now I'm commuting down to Chicago from Glencoe.

Wilmot: How many hours is that?

Bragg: At least an hour one way.

Wilmot: Okay. So when you moved to Chicago—

Bragg: Well, now it's a matter of ten or fifteen minutes to go from where I lived to where I worked.

Wilmot: Did you buy a home at this time?

Bragg: Yes.

Wilmot: Where did you move in Chicago?

Bragg: We moved on the south side not very far from where my wife's sister lived. In fact, right across the back fence, practically.

Wilmot: And was this a home?

Bragg: Yes, it was a single-family dwelling. It was her younger sister, the older sister lived in Orange, New Jersey. But the younger one, a very lovely person, they lived on—I forget the name of the street, but—across the street, rather across the back alley on the next street over, and maybe one house diagonally, we were almost across the back fence. There was a couple who were putting their house up for sale. And at that time we hadn't really been seriously active, but by now I'm saving—I not only have the money that I've mentioned in the bank, but we're adding a little more savings to that, and I'm making

pretty good money too. So by now, of course, you see it's quite a bit more than I had started at.

So I talked with a guy I know, went to talk with a guy who—what was his name, McMahon? And he had this house which was not a very big one, and a lot adjacent to that which could have held another house. The house itself was actually rather small. They had built these things right after World War II, and they tended to be about four rooms or something like that, and a basement. But the deal was that with the adjacent lot I was planning to essentially double the size of my house once I bought the place. So we reached an agreement on the price, which my lawyer told me was too much. But now the question is, how do I finance it?

At that time, if you were black, to get a mortgage, a regular mortgage was a pain because you needed so damn much money down, something like 30 or 40 percent, some outrageous figure. It wouldn't be true today anywhere. But at that time the thing that discouraged home ownership was the down payment was so large that nobody could afford it. What typically happened was that people would take what was called a second deed of trust, in other words carry two mortgages. One is the regular one at normal rates, and the other is another amount at somewhat higher rates. It's practiced all the time, the first and seconds are quite common, although nowadays with such low down payments I have to wonder if it's as common now as—I doubt if it's as common now as it used to be.

But between the first and second, it turned out that McMahon, who was on the board of a credit union, was able to get me a second by mortgaging all my furniture and my car and stuff like that. [laughs]

Wilmot: So that second covers the immense size of the down payment?

Bragg: It took up whatever the slack was. I don't remember what it was, but I wound up with a legitimate mortgage, you know, with a regular mortgage, and very quickly paid off the second. So that's how we bought our first house. And money problem was alleviated to some extent also because when we moved back to Chicago, my wife did go back to work. She was working in the children's division of the Chicago Welfare Department, they welcomed her back and she went back to work. It actually improved her disposition. After all, she was just sitting around the house with not much to do. So that worked out fine, that got us back to Chicago.

Wilmot: I'm thinking that we should—I'm sorry, what were you going to say?

Bragg: Oh, just saying that got us back to Chicago. It didn't get me away from the foundation yet, but we had moved back to Chicago.

Wilmot: Okay, well, I guess we should end for today.

Bragg: Very good.

Interview 8: July 16, 2002

Wilmot: So, good morning.

Bragg: Good morning.

Wilmot: Today is July 16.

Bragg: Right.

Wilmot: It's July 16. I'm here with Robert H. Bragg. So I had these two questions for you earlier today. We were just talking about—I wanted to ask you what do you love about what you do, what you've chosen to devote your professional life to.

Bragg: Well, basically I like solving problems, and science is like puzzles, except that the answer always brings another question, so you never really answer the question. But answering the immediate question, I guess, is the challenge, and it's fun. And I wouldn't do anything else, really. I can do it now at age eighty, and I expect to do it until I die. As I say, it's the challenge of learning new things that—it's different from puzzles in that when you get done there's always another question, you see. So in that sense it's an endless frontier. I didn't coin that phrase, it goes back to the guy who was famous and was instrumental in getting the National Science Foundation started right after World War II, "science, the endless frontier."

I like it because I like to solve problems or puzzles. I think basically that's my epitaph, that I'm a problem solver. I can flower that, but basically that's where it comes down.

Wilmot: You also said when we were talking about this, earlier you were talking about what happens, how it's important to—it never ends, but it is important to focus, otherwise it becomes too diffuse.

Bragg: Yes, very much so, that's a very important point. The world is filled with people who dilute themselves so much that they never really do achieve very much of anything. Jack of all trades, master of none, that's a phrase I'm sure you've heard, and it's a kind of a bromide, but it's a very accurate one all too often. On the other hand, oddly enough, most scientists feel that they can do just about anything. [laughs] So you have to be careful. Only a few are really that good that they can spread themselves over many fields and still do very good work in any of them. So, there's only so much time, you've only got so much of anything, and you have to make an optimum choice of how you spend your time, what you focus on, in order to make sure that you get something done. And that means making some kind of a choice where you're going to dig in.

In my case it took a while to do that, if you look over my publications and my career up to the time that I came to teach at Berkeley. I did a lot of different things. Now, they were all in the same general area of science, and always seem to have one foot in the use of x-rays. But since I chose to work not only in x-rays but applied to studying materials, —more broadly, the question is, "What area do you work in?" I could very well have chosen to work in semiconductors because that's where all the money was, in electronics. Silicon Valley is full of people who—that's what they do. But I got intrigued

with carbon materials back in the early sixties, although I still was involved in other things if you get back to that, of course.

When I came to Berkeley, when I had a chance to choose to do what I wanted to do, and not terribly dependent upon where the money was going to come from, I picked carbon materials because there were problems that had come up that intrigued me and I thought those were puzzles that had less baggage, there was less known about them. You are always lucky if there is less known because you have better chances than if everybody is working on the same problem, and they're all about as good as you are. [laughs] A certain amount of competitiveness.

But if you're in a field that's already mined out, you have to be very, very, very outstanding to make just a little bit of progress, whereas if it's pretty open, then whatever you do is news. So in that sense there is a certain amount of gratification that goes with it.

Wilmot: I'm wondering also, because I know that in some ways you spent a good part of your career in the private sector working in industry, and I'm wondering in what ways has that focused the direction that your work had taken, or made it more diffuse.

Bragg: It's a good question. Actually, the first five years in a sense wasn't really industry. I think of industry as being totally driven by profit and immediacies of problems without regard to just curiosity. Now it's true that when I worked the first five years in the research lab of the Portland Cement Association, we were working on problems related to cement. So in that sense it did have an industrial focus, but very broad. And within that we were free to tackle problems that were generic to the whole industry. We didn't have to worry about the cement plant in Buffington, Indiana, or something like that who had a problem with cement clinker. If the problem were very pervasive, if everybody had it, then of course we would get interested. So we worked on problems that were quite general. In that sense it was driven more by the general nature of the situation rather than specific things.

And the money, although we weren't very highly paid, was—there was not, at the level that I saw it—I—back up—the program went on at about the same level. There were no big jumps in budget for equipment or whatever, you planned way ahead. And things just sort of went on and you did your thing and enjoyed life. That five years was—I am very grateful, although I thought I was underpaid. It was nice to be able to work without a lot of pressure from the sponsors to come up with this and solve that. So I learned an enormous amount in those five years by being just free to be curious and focus on solving the immediate problems that I was presented with. I didn't create those problems, they were there and other people and my immediate boss put me to these problems. But given that, then my skill as a problem solver was what was the issue, and learning how to do that is wonderful. So I'm very—I left with a certain amount of recriminations, but basically I don't have any hard feelings about—I have nothing but really—overall I was very lucky to not have to start out my scientific career under a large amount of pressure.

Wilmot: Sounds like it gave you a real freedom to just be curious and to learn your craft.

Bragg: Also to discover I was a scientist. And that's—I don't know if I've mentioned that, you might ask the question, if you didn't you ought to ask it, how do you know when you're a scientist?

Wilmot: How do you know when you're a scientist?

Bragg: [laughs] Okay, I'll tell you. It's that transcendent moment, I suppose that's the right word, that is hard to describe, but it's such a feeling of exhilaration when you realize, “Why, I've solved this, I understand this! I've been able to put this and—I've put these things together and synthesized it into some basic simple statement that explains an enormous amount of things, that puts it all together.” And I think I did mention, maybe I did, the experience of over Christmas holidays coming up with an understanding of how all the experiments that were contained in the famous *Bulletin Twenty-Two* of the PCA, I explained most of them [laughs] on the back of an envelope, it was almost that simple. It was just a few facts. Now, it wasn't that I was all that brilliant alone, although I'd have to contribute some. But the new fact that I brought in was a knowledge of crystallography that I had learned when I started to study x-ray diffraction, x-ray crystallography. So I had another point of view that wasn't very commonly available to the people who had gone before me. So perhaps if they had had that background, they wouldn't have done a tenth of those experiments that they actually did. Incidentally, most of that never got published, [laughs] I might add.

But anyway, the question, “Well, how do you know?” It's when you manage to take a lot of facts that people have tried to understand to see how they relate, and find that some simple model—that you can predict all of them from a very simple starting point. When you're able to do that, when you hit that moment, yes, now you know. It's not just, “I can work problems that they have in the classroom, and there's an answer in the back of the book. I can put the answer in the back of the book.” That's the difference.

In fact, after I left the PCA and went to work at the ARF, the foundation—I might add that—

Wilmot: The research foundation.

Bragg: Yes. This is kind of getting off the track, but put it in there somewhere. When I left, I had mentioned that—when I had a tiff with my immediate boss, who wasn't a bad guy, really, but he was kind of relieved to see me go, at that time. It turned out it wasn't that beneficial for the PCA for me to go, because I had managed to reach a level of sophistication with x-ray equipment that they had spent some years to getting around to buying, and now they had nobody around there who really knew how to make it go. And to replace me turned out to be rather expensive. Not that I was all that good, but for what they were paying me they would have to go all of a sudden pay a lot more. So the upshot of the whole thing was that far from my loss causing no ripple whatsoever, my boss became a pariah. Is that the right word?

Wilmot: Yes.

Bragg: My immediate boss. Not a bad guy, mind you, but he became—well, sort of a guy who wasn't all that well liked. How to put this—he should have pushed me, my fortunes, more vigorously. In other words, had he been more pushy toward getting me promoted

and so on, then it would never have come to that impasse where we had a big falling out and I left. I would have gotten more, and I would have been happy to stay. In a way I'm glad he did, because it was good for me to leave. But it didn't help him any. And Brunauer, who was his closest competitor, they were more or less of equal stature, Brunauer became the fair-haired guy at the lab, and he tried to hire me back after I had gone to ARF. We spent hours over the phone, thinking that I had moved out to Chicago into the ghetto and things like that. [laughs] But Brunauer —

Wilmot: But he thought you had moved somewhere in Chicago?

Bragg: Oh, he knew where I had gone, but he—I don't know why he brought that up, but I do remember him talking about ghetto [laughs]—

Wilmot: “Come on back from the ghettos,” maybe? [laughter]

Bragg: He wanted me to come back and join the lab. He pointed out all the advantages, which I understood, and I, in fact, I really hadn't thought of that. But the most important thing that he said was he said, “You know, the work that you did, the reason why I think you should be here is that you really are a scientist. And the work that you did, I wouldn't care if it was all wrong.” In other words, that insight that I mentioned over the Christmas holidays, it wasn't wrong, but he said, “I wouldn't care if it was all wrong, because you were thinking like a scientist, it was creative, it was original, you really were thorough, that's the kind of people that we really do need.” So that again reinforced my conclusion that, “Yeah, I am a scientist.” So it's a wonderful moment, and you don't get it all—the first time you get it, of course, you can never get that high again. But once you know it, then you're on another plane. You don't look any different, but you're on another plane.

Wilmot: I have another question for you—

Bragg: Speak.

Wilmot: —which is about how you connect your work to your community—

Bragg: That's a question that if you're lucky enough, if you're a minority, black in particular, lucky enough to have had some success in whatever it is that you're doing that kind of sets you apart, the question invariably comes up, how do you give back to community? One way of stating it is, “You should give back to the community,” or is it really relevant and so on. And it's a good question. It's a question that the majority community, white people don't really have to ever talk about, because it's presumed that whatever they're doing is relevant, it's all part of the whole societal scheme. And so if you're a stockbroker, if you're the president of Enron, (well, he just happened to be a crook) but [laughs] nevertheless whether you are an MBA or a clerical person or a cleric, it doesn't really matter, whatever one does, it's part of the things that people do and you don't have to apologize or justify it. But in the case of minorities, once you get out of the ditch, that question is always coming up.

And the thing that you have to worry about, have to watch out for, is that if you get involved in doing the community's work, then basically you've just become a social worker. And the thing that made you notorious—not in the pejorative sense, but the

thing that made you outstanding was not doing community work, but doing whatever it is that you did that was outstanding. Now, within that context, however, one does have a responsibility. First, number one is money. You—if not number one, up near the top, either you make contributions to things that do involve the community. If you're not up to doing that, of course, then you're hopeless. Time is another one. That you have to be chary of, because you can't become very successful and that means outstanding when the guys that you're competing with are also smart and also gifted, and they're working like hell. So if you're off attending community meetings all the time, you're not going to be getting much done, and pretty soon—this used to happen a lot to minority people who come to the university vying for faculty positions, and they got involved in community affairs and don't do their research. And the next thing you know they won't make tenure and they're out. They would have been much better off to concentrate on getting their tenure, and budget some time for helping students and consulting—by consulting I mean advising—where possible. But the thing that the community wants best, I think where the answer to the question is, your best contribution is to become outstanding so that you essentially elevate, you justify, you—what's the word now—you make credible the status of minorities by the excellence that you are achieving.

And this is a kind of a disjointed response to your question—

Wilmot: Actually not—

Bragg: —but one reason why I, for example, have worked a lot with Africans in the scientific context is that until Africa is admired, we're not admired. See, we're derived from Africans, we're African Americans, but we carry a kind of a burden of presumed inferiority, because Africans are assumed, they were assumed, presumed to be inferior. So until they are validated, we're not. So that's a kind of a selfish way of putting it. But my point is that excellence is the best contribution that you can make. Excellence without that arrogance, now we don't need.

I might add that I've gotten lots of plaques, awards for service to the community, the student groups and things like that, where I've been student advisor for black engineering and science students, things like that that I could do where I lend credibility to them, and also experience and muscle, clout with the university. Things like that, those are the kinds of contributions you can make. It still takes time that other people aren't giving, but it's not totally irrelevant to your overall purpose. But the last thing you need to do is to get involved in political matters. People who major in political science, that's where they get their kicks, and let them do that. But the last thing you want to do is to play their game if you're not good at it, and essentially ignore and denigrate, dissipate your talents that you are good at. So, it's not a good thing to do.

I mentioned Percy Julian, didn't I?

Wilmot: Yes, you did.

Bragg: Percy Julian, the incident that I mentioned, speaks to this issue. It would have been much better, even if he only spoke with me for ten or fifteen minutes, if he had said, "Yes, well, look, I don't have a lot of time, but if he's trying, I can spend a little time talking with him." I would never have refused the same request, incidentally. And locally I've supported black students, engineering students, science students, at times

when I didn't particularly think they were going very far, but who knew? They should be encouraged. So that sort of thing I'd certainly do.

Wilmot: Well, I do want to talk to you some more about BESSA, Black Engineering Science —

Bragg: We're sort of jumping ahead, but—

Wilmot: We'll talk about that another time then. It's interesting though, because when I spoke to—I spoke to one of your former students in Connecticut earlier this week, actually last week—

Bragg: Former student?

Wilmot: A former student, yes.

Bragg: [laughs] Oh, Bose!

Wilmot: I spoke to Mr. Bose.

Bragg: Oh, now wait a minute, Bose was not in the BESSA, he was a graduate student.

Wilmot: Oh, I understand he wasn't in BESA, I understand that. But we had an interesting conversation, and he really, really spoke to me about how supportive you were of himself and also other minority students, he really spoke to that a great deal.

Bragg: Well, that coming from him, that's a good statement, because I have a high respect for him. One of my, just about my best. [laughs]

Wilmot: Yes. He also said to me, we were talking and he told me a story of how you had lent him your car, your beautiful car.

Bragg: [laughs] I don't remember that!

Wilmot: He said you lent him your Cutlass Supreme, you had a beautiful white car—

Bragg: Yes, I did, I did, yes.

Wilmot: —and you lent it to him to drive to LA.

Bragg: I don't remember that. [laughs]

Wilmot: And I told him that you were driving a Honda Civic now, and he said, “Oh, he's gone downhill!” [laughter] He was really funny. Well listen, I'm going to close this off for now. [referring to video]

Bragg: Okay, fine.

[interview interruption, conversation about best set up for video recording while reviewing video, after viewing video there is a decision to re-record this portion of the interview]

Wilmot: We said some good things. My first question for you is, when did you know you were a scientist? [some repetition for the video]

Bragg: Good question, the most important one you've asked so far. [laughs] And one that you ask yourself when you're coming along, especially if you have come through a period of education where it's assumed that you can't do it, "You're black, and therefore inferior. And yes, you can be trained like a robot, but you're not really creative."

Wilmot: Hmm, did you encounter that attitude?

Bragg: That voice is—nobody said that, but that's the impression. If you ask a question in the classroom, sometimes I used to get guffaws as though an idiot had spoken, until after a while students would realize I had said something intelligent. So I mean, you've gone through this—

I mentioned earlier, having that experience of synthesizing a lot of—almost all of *Bulletin Twenty-Two*, which was years of research, down at the Portland Cement Association, from a very few simple facts, being able to put all of that together based on a simple model which had—and had the advantage of having learned some crystallography. In particular the crystallography of clay mineral, which had layered structures. I was able then, using that knowledge, based on that structure model, to predict just about everything in *Bulletin Twenty-Two*. I mentioned, when I showed this to my boss, he almost didn't speak to me, [laughs] my immediate boss. But his boss changed his whole talk when he went to Stockholm based on what I had come up with. Well, when I was able to do that, when that first thing hit me during this Christmas holidays, and then everything I tried turned—it just got better, and better, and better. And I spent that whole week, that Christmas week working out the details of the consequences of this model. I knew then that I was a scientist. There's no way—I mean, I didn't look any different. But I had gone up a notch.

Wilmot: And that was in 1950—

Bragg: That was in 1953 or so, '53 or '54.

Wilmot: Yes.

Bragg: Right then I knew, it was not just being able to work the problems in the back of the book, I had put the answer in the back of the book. That was the difference. So you know when you've done that creative step of synthesizing, put things together that nobody had done before, at that moment you know more about it than anybody else in the world. It's a great feeling. You may not keep it long, but it's a great feeling. So, yes, you know when you have that transcendent moment.

Wilmot: Okay. I wanted to ask also how you relate the work that you've devoted your professional life to, how do you relate that to your community, if you do?

Bragg: It's a good question, it's often asked, and it's a very important question, really. Because—incidentally, white people, the dominant culture, doesn't have to be—it's never confronted with this question. It's just assumed that whatever they're doing is meritorious, it has merit. So it relates, it's a part of what culture does. But our culture,

and I'm going to denigrate it by saying based on picking cotton, but basically heretofore has been seen as essentially blue-collar people at best. The talented tenth that Du Bois wrote about was not that widely understood or appreciated as being that relevant. So the question that you get asked all the time is, "Yes, but, so you're doing science, but it's not relevant." And the presumption is, "Well, you should be out there on the picket line, preparing posters and protesting this, that, and the other."

Incidentally, I've done all of that. But it's not what I should have been doing. Let's just back up, that's not quite the way I want to put it. Some of that is unavoidable. Doing the Selma march that you've seen on television, when Whitney Young, the heads of the NAACP, SNCC, CORE, people from all over the world, from all walks participated in that march, irrespective of whether they were scientists, or engineers, or humanists, or whatever. That was—that one moment when that public display of solidarity around that issue made sense. But you can't very well become outstanding and eminent in what you're doing if you're always in public display meetings. So you have to become outstanding make a sacrifice in terms of the effort that you put into what it is that you're striving for stature in. And the guys that you're competing against don't have that problem. They're doing their thing, and you're off doing something else, they'll beat you. So you're not going to become very outstanding, and people will then not look up to you, because you didn't achieve anything. So in order to make achievements, you do have to make allocations of time. You can't—how to put this—you want to validate your community, that is, to raise its esteem by your contributions. Your success helps to elevate the whole notion of what your community is all about. So unless you're about doing that, then you're just another politician. So maybe I haven't organized that as well as I'd like, but I think the basic point is that you validate the—you destroy, you attack the notion of inherent inferiority by being successful in nontraditional roles. So that's the most important thing you do, you've got that talent, by all means you should develop that. You mustn't become arrogant or indifferent. But that's the most important contribution you can make. So far from being irrelevant, I think it's highly relevant.

Wilmot: Your scientific work.

Bragg: Yes. I might add that I used to be—I've always belonged to the NAACP, for example, I'm a life member. I've been a life member for about thirty years. But I was in the youth council of the NAACP when I was right out of high school, in high school actually. So I've always had a political consciousness. When I lived in Palo Alto, I was the president of the Palo Alto chapter of the NAACP, went through all the offices, and led protest marches and things like that. So it's not that I've not done those sorts of things or have anything but admiration for people who do them, but that was a digression from my immediate thrust of striving for excellence. So you don't forget, but you have to remember what it is that you're trying to achieve, and play that game.

Wilmot: More focused?

Bragg: Yes.

Wilmot: I understand, I understand. Let's see. The first question I had asked you when we started out today, which was—I'm trying to remember what it was, we talked about it a great deal, we were talking about what do you love about what you do. And you kind of

answered it by saying that moment when you know you're a scientist. I'm wondering if you could speak to that a little more.

Bragg: Well, that's the general statement, that you love it because it's—either you enjoy solving problems, in this case solving problems means creating new knowledge. I don't mean solving puzzles, where the answer is in the back of the book, but where you put the answer in the back of the book, you supply the answer. I might have said this already, but in a way when you've done a good piece of research, it's original, and contributes to the overall body of knowledge about that subject, that particular moment, it won't be for long, but you know more about that subject than anybody else in the world, which is kind of an ego trip. But it's a pretty heavy experience to know that, “I've moved this field this farther ahead.” But what you've done is to move the whole field, and everybody else can now participate in that, so it's not just you. Once you've done it, unless you've let the world know it by publications, of course, it doesn't come to anything, so that's why you've got to publish, naturally. But the thrill of doing that, unless you enjoy that kind of activity, then of course you won't do science. But if you do, then that's nirvana. I just love it, and I get paid to do what I do for free. In fact now I don't get pay, I still work at it. [laughs]

And if there would be one piece of advice that I'd give to anybody, and I constantly do this, I might add, is to get into something that you like doing, because then it's not really work. You don't want to be in something where you hate to get up in the morning, you hate to go to the job because you don't like your job. What you want to do is to want to get up, you can't wait to get there. That's the kind of work you want to get into. If you've got that kind of job, that is never really work, and you don't mind it.

I've been lucky, I've been able to do that for the last—God knows how long now, from the fifties.

Wilmot: I have a question, you said you're working on something now, what are you working on now?

Bragg: It's a problem that I've been working on bits and pieces of since back in the early sixties when I was still in industry, got involved in—we'll get back to this, of course, but got involved in work on carbon materials from a very nuts-and-bolts point of view. I was working in a Lockheed—the research laboratory of the Lockheed—what was then the Lockheed Missiles and Space Company. And I had come there from the Armour Research Foundation in Chicago. I arrived at the lab—I was hired to bring some intellectual muscle to their x-ray diffraction laboratory. They had a laboratory, but the department manager was justifiably not satisfied with the quality of personnel in the laboratory at the time, earnest, but not particularly skillful. And he, Ed Burke, made a search of the country to locate somebody, and hired me. Ed Burke had a good research background, knew enough to know that just about everything you did in materials, you have to have some knowledge about the structure of materials. And one of the important ways of doing that was to use x-ray diffraction. So x-ray diffraction was very key. So you needed someone now, who was really heavy in x-ray diffraction, and that's what he was trying to find. Well, if that's true, then you get involved in almost everything that's going on in the laboratory, because everything has to do with materials, and every material has structure. So right away I was getting involved in everything, the x-ray part of it.

Well, what that did was to lead to—it had such an impact that Ed—I solved a problem for Ed that Ed didn't know what to do with. He had a rather large section, department, rather. But he had a lot of young guys who were employees for three-quarters time. They had a program that enabled these young guys to go to Stanford or Berkeley to work on their Ph.D.s. It was a great program—so they could work part time, earn enough money to earn their tuition. In fact, the lab paid their tuition. But they were doing different things, so how could you get this thing under control? So he created a group for me, and they were bright, bright young guys, we had a lot of fun. Anyway, but the point is that along the way a big issue then was carbon materials, always was, it still is in the aerospace industry. Because it turns out that with the exception of things like the shuttle, which has re-entry materials composed of things like silica, sort of like sand—the ballistic missiles, which get much hotter, much hotter, in fact practically burn up, so their shield materials are based on carbon. So you can't very well work in that field without getting involved in carbon.

We were involved in—you have to understand that in the missile industry field, you're constantly going into research and development because once you've decided on one particular design, that design is going to be around for five, ten years or so, and now you're doing research to get more information to lead to something that's better, i.e., make the previous design obsolete. So you're constantly trying to improve things. Well, that's a very roundabout way of saying that I got involved in carbon materials. And knowing nothing about the subject in the beginning. I don't think I even knew the structure of carbon when I went there—of graphite, I mean. I learned a hell of a lot in a short period of time, reading the literature, which just abounded with papers on the subject, many of them not terribly good, but I got involved in both the x-ray aspects of carbon material, but also—that is characterization and so on—but also measurement of physical properties. So that now I began to bring in my knowledge of solid state physics. Up to now it's just another problem out of the blue. But it turns out that not long after I got to Lockheed there was an international conference on solid state physics or something in Japan, and they let me go. So after a number of years of having not been in Japan, I went back.

While I was there I went to visit one of the labs of Japanese scientists whose papers I had read and had corresponded with, but had never met them. So I just took off and made a side trip to go to—I guess it was—I don't know, one Japanese town, Nagoya, to visit the laboratory. And they showed me some material which was called glassy carbon. It's called glassy carbon because it looks like a black glass, but it's not a glass, because it won't melt. But be that as it may, there are other problems associated with the terminology. But the point is that I was introduced to glassy carbon, and I brought some of it back with me. The Tokai Chemical Company is what it was.

When I brought it back to the laboratory, we were trying to get a substitute material for the existing heat shield material for ballistic missiles, a lot of money being spent on developing pyrolytic carbon, and woven carbon reinforced plastics and stuff like that. And there were certain things about the glassy carbon that looked like it might be superior in this particular environment, a very hot—high heat flux, it's called. Well, also, being a solid state physicist, in addition to everything else, above all else, I'm interested in electrical properties. Also, we're down in Silicon Valley, you see. Right away, you think electrical properties no matter what. Besides, I had been in the solid state physics division of the Armour Research Foundation, where I worked on electrical

properties and thermophysical properties. So it's natural to look at them—although we weren't interested in them, for me it was curiosity. And one day I happened to have a piece of this glassy carbon, and while in the laboratory, and I didn't know how that happened, but I just took a piece of it and hooked it up to an ohm meter—(an ohm meter measures electrical resistance)—dumped it into a bath of liquid nitrogen—a beaker sitting there had some nitrogen in it, liquid nitrogen, which is minus 77, it's 77 degrees Kelvin, rather cold. You've seen demonstrations where you put rubber in liquid nitrogen and it becomes brittle. That's how hard it makes some things get.

But anyway, I would expect, if it was a metal, that the resistance would have gone down. Very important, instead of the resistance going down, it went up slightly. And this shouldn't happen, because graphite is assumed to be a semi-metal, and so it should have been metallic. But instead of being metallic, it looks like a semiconductor. “Whoa, what's this!?” Well, nobody had ever seen that. And so I was intrigued by it. Now, that was really interesting. If it had done the ordinary thing I wouldn't have been that excited, but it did something extraordinary.

But we were not being paid to study the electrical properties of glassy carbon. We were being paid to characterize the material, look at thermophysical properties, how it responds to high temperatures, but not electrical properties. So I just put it in the back of my head. It was one of those things, “Gee, I wonder about that.” Well, when I went to teach at Berkeley—this is a long way around answering your question—

Wilmot: That's okay.

Bragg: [laughs] Never say one word when two will do.

Wilmot: Okay, good, good motto.

Bragg: When I went to work at Berkeley, at Berkeley I was there because of my expertise in x-ray diffraction, not because of glassy carbon. But there was nothing detrimental about working on glassy carbon, it was again material science. Carbon was of interest to the Department of Energy, which was where our money was coming from, our research money. But I was more or less free to set up my own research program. Although I was hired because of affirmative action reasons, they actually did need somebody who was good at x-ray diffraction. So it turned out that it worked out good for everybody. But I don't think if it hadn't been for affirmative action, I probably wouldn't have gotten that job then. Now maybe, but not then. But I had a choice of what I would do, and decided of all the things I had been doing, there were two things that I was interested in. One had to do with composite materials made by directional freezing, that was fascinating to me, of some research interest. And the properties of carbon, the electrical properties of carbon. Not only electrical properties, but structure. But it's not really crystal in the usual sense.

So I decided to pick those two areas to work in. Then at first we did work in both areas. You can see my publications either have to do with composite materials or carbon materials. I was not interested in composite materials in the sense of re-entry materials. But the work that I was most interested in had to do with applications that you make by freezing them in a certain very controlled way. It's called eutectic solidification. When you do it in a directional way, you control it, you can change, modify the material's

properties quite a lot. And right now people are doing things like this in aircraft engines, the blades in aircraft engines are being frozen in this way.

But the point was that I had only a small number of graduate students, and not an enormous budget. And my competitors would have been the aircraft engine manufacturers. Well, I knew most of the people at that time who were doing the industrial research, and they had much more. Except for very esoteric problems in that field, I wasn't going to be able to do anything that was really new. It was a question of facilities and manpower. So I decided of all of the two, it was much more interesting and much less known about the glassy carbon and the carbon materials than the eutectic composites. So that's a long way of answering your question, I finally decided, "Well, there's so much that's not known about this material that is still interesting, that this is where I'm going to dig in."

In fact, the students I had then, they had a choice of finishing whatever Ph.D. they were working on, whatever we happened to be doing, or change over and pick up the research that I wanted to concentrate on.

Wilmot: On glassy carbon —

Bragg: Glassy carbon at first, but ultimately certain much more fundamental problems about carbon than just glassy carbon. But glassy carbon and its peculiar electrical properties is what got me there. And you will see from my publications, did a lot of work on electrical properties of glassy carbon and other carbons too, later.

But between that structure and the focus of research that I have been doing ever since—

Wilmot: So currently today it's still going?

Bragg: Right now the problem that I'm still working on—and I'm very gratified with how it's going—is to elucidate, I like that word, the kinetics and mechanisms of graphitization. Now, what that means is if you take any carbon material, any carbonaceous material, (and that could be some leaves off a tree, or fossil fuel oil, oil from—almost any organic material), if you heat it in an inert atmosphere, that means not oxygen but nitrogen or argon, something where it won't oxidize, but decompose, if it decomposes, it will eventually give off all kinds of gases, some very complex and others simple. But what you'll be left with is a gunk which is essentially all carbon. And if you can continue to heat that even hotter—and now we're talking about temperatures where the piece will be white hot, if you look at it, it looks like the filament of a light bulb. In fact, Edison made light bulbs out of carbon filaments, another story. In those incandescent conditions where the temperatures are above 2000 centigrade, getting up to 3000 centigrade now, the material gradually transforms to graphite, which is crystalline. You find graphite—crystalline graphite occurs in nature, abundant deposits in different parts of the world. So it tells you something about the history of the flora of that region, there must have been sometime when they were very hot for a long period of time. But anyway, that phenomenon, how that happens on a structure level atom by atom, atom by atom, that's what I'm concerned with.

Wilmot: At this time.

Bragg: Right. So it's the kinetics—not only what happens, but how fast. And the reason for knowing both is as far as the kinetics are concerned, if you know what the kinetics are like and the mechanism, you have a way of understanding—well, first of all you have prediction. You can say, if I do this, make it this hot for this long, it's going to transform into that condition, and I can predict what it's going to be like at some later time. And that you want to know this because of the need to control. And in fact, just about all manufacturing of anything, that's key to the processing, knowing the kinetics and mechanism. Whether it's making bread, it shows up in cooking, or refining oil, or making pills for asthma, it doesn't matter, they all have the same conditions to worry about, kinetics and mechanism. So that way you save money, you have control. And also you have the possibility of altering it. Once you know what the mechanism is, you might say, “Well, if I do this, I might change it that way.” So you might add some other kinds of things, and that's commonly done, I might add, almost universally done. So, understanding first and then try to control—then you've got control, now you can improve on it. So it's a neverending process, of course, because no matter what you do you will never do it all.

Wilmot: Yes. I'm wondering if we can shift—well, in terms of like focusing on this work now, are there people that you're working with, or where do you—?

Bragg: How do I keep going now?

Wilmot: Yes.

Bragg: Good question. Not as good as I'd like. I depend now on collaborations. If you look at my papers, you'll see that virtually none of them are single-author. When I was working with graduate students there was good reason for that, and that is the graduate students in general do the scut work, and hopefully do the brainwork, but not always necessarily. In the case of working with graduate students, my experience in working with—that first few years at the PCA, always being the junior author on papers when I had done all the work, really made me sensitive to the primacy in authorship. Now, it's true that traditionally if you're the head of an institute, your name goes on all of the institute's papers. That was traditional from Europe. It's coming out of vogue to some extent now, but it's still fairly common. But I didn't like it, and I felt that when I got to the point where I could do that, unless I had done more than half of all the work, the students always went first.

And after a while I realized that it didn't matter because if you're in the field you go to international meetings, people know who is who. So you don't have to be out front all the time with your name out front as long as it's in there somewhere they know. If you see Smith, Jones, and Brown, and Bragg, they say, “Well, it's Bragg's.” So it doesn't matter. So I found that also being generous about acknowledgement gets you a lot more collaboration than being greedy. And also if you've got good ideas, very often people who have skills that you require to move ahead don't know what to do. And so you give them purpose, and if you had success in the past, they know that if they go ahead and work on this they're going to get a reward in terms of significant publications—getting—yes, that's the reward, ultimately, that good work gets published, and people get recognized for what they've done. So I've managed, at a slower rate, of course, to involve other people in collaborating with me, usually supplying experimental results or

even calculations by more or less guaranteeing that, "If you work on this, something good is going to happen." So that's how I keep doing it now.

Wilmot: Okay. I'm wondering if we can shift back to where we left off at our last conversation last week. We were talking about your move to Chicago, from a small—

Bragg: Oh, yes. [laughs] From this 200-man lab to 1,500-man lab.

Wilmot: Yes, and also just your family's move to Chicago from the small commuter kind of suburb where you were located before, outside of Chicago.

Bragg: Well, the move was—I talked about what precipitated that. I might add that I—I guess one thing I hadn't mentioned technically was that we had designed and built a small-angle scattering apparatus, but we never did really use it for anything that got published. And at that time there wasn't that much known about small-angle scattering anyway in the literature. So—but I had that background with me when I went to the foundation, and I'll come back to that. But in terms of the move, as far as the family was concerned, moving to the foundation at first, I was commuting. Now, it's a reverse commute. [laughs] But around 1959, earlier, say than late '58, I think I mentioned this, that there was an incident that—part of the thing that made me decide to move back into Chicago was the business about the image that my son had gotten from what kind of—what careers were available to black women. All he had ever seen in black women who were working was as domestics.

Wilmot: That's who lived in your community.

Bragg: Well, we lived in an upscale—essentially an—practically all-white community except, of 3,000 people there were 100 black people.

Wilmot: In Glencoe?

Bragg: Glencoe, yes. But except for one other family, we were the only—myself and A.L. Foster—were the only white-collar people black people who lived in the town. Now, we went to a small Methodist church there, it seated 100 maybe. It could seat everybody black in the town. [laughs] But my kids went to integrated schools, they would have sleepovers and things like that. And my wife would drive in a carpool. And all that was fine. In fact he—but he had never seen a black woman working who was not a domestic. So one day she made a statement, she thought she might go back to work.

Wilmot: Your wife?

Bragg: My wife, yes. And he said, "Will Mama be a maid?" That really got me. I thought like maybe this is not really the best community to be in, despite everything. How to counter that? It's true, he knew I was professional, and my friends were professional, but he never saw them working. I had friends whose wives were teachers and things like that, but he never saw that. But anyway, by '59 I think it was that problem, that situation, plus tired of commuting. It was really a pain. Plus a house became available in Chicago very near where my wife's younger sister lived in a kind of a middle-class black neighborhood on the South Side in the nineties, I forget where it was now, but—. In fact, practically over the back fence.

Wilmot: From your wife's sister?

Bragg: My ex-wife's sister. And also savings by that time, and salary and all that had reached a point where it was possible to buy a house. So that's what led to our moving in '59.

Wilmot: I have one quick question about Glencoe which I didn't ask before. You've kind of talked about the black community in Glencoe as being—

Bragg: Domestics, mainly.

Wilmot: And fairly small?

Bragg: Yes.

Wilmot: Did folks own their own homes?

Bragg: Some did.

Wilmot: Or were they renting as tenants?

Bragg: They had—interesting, they had—Glencoe, at the time that I arrived, there was not the Glencoe that they had seen. The black people that I found there for the most part had been domestics, but in different parts of the town it was had been unincorporated. That meant that the—how to put this—black people owned places, owned land, and somehow it got put into the corporate limits. And at the same time a syndicate of builders decided to come in and get rid of all the black people by essentially condemning their lands, and they would have to sell, and you would have nothing but white people there. Well, some of the black people were smart enough to go and get a good lawyer, who got an injunction against the city for doing this. The claim they had made was that they needed this for parks. Well, what he did was essentially to force them to make parks where they were condemning this land, and that stopped it. So it maybe has changed by now, but when we went there Glencoe was just full of parks, you wonder, “Why do they need all these parks?” Well, they got stuck with them [laughs] is what happened.

So we were—the move from Glencoe, which had great schools and all that, that cool north shore area, each town, they're all upscale, essentially upscale bedroom communities. People who work—the daddy works downtown in the stock market, or now maybe in downtown Chicago in the business district. He rides the commuter train everyday. Or he works in a laboratory or something like that. But basically they were upscale middle-class or upper-middle-class white people except for us black people. And that led to a rather false impression of what the reality of life was like. Evanston, Illinois wasn't that far away, but we didn't have much to do with Evanston. There were a lot of black people there, comparatively.

Moving to Chicago was culture shock for my children because they went to schools that weren't considered bad schools by local standards, but compared to the schools that they had been attending in Glencoe—the children were entirely different, first of all, they were all black, they weren't used to that. And second, Chicago kids weren't that well grounded in the notion of excellence in academics. In Glencoe, if the teacher asked a

question, up shot your hand as quick as you could so you'd get to give the answer. In Chicago, in Gillespie Street School I think it was, when that happened to my son, he would answer the question, the kids would beat him up. So, and I'm saying now these are not—this is not a ghetto—people owned their own homes around where we are. But it's just a different cultural environment, and as I say, it was quite a culture shock. And my son began to try to learn to talk in ways that he didn't talk naturally.

I remember one time somebody told me that the principal had overheard him speaking in the hall, said, "Where did that little boy come from?," because he didn't sound like a black kid. Well, he still doesn't to this day. Nor does my daughter, for that matter. It's something about the intonation and whatnot that comes having grown up, gone at the earliest ages to school with white people, and mostly from well-to-do homes with lots and lots of emphasis on education. They just speak differently.

So it was quite a culture shock, and in some respects it's good we didn't stay there much more than about two years before we moved to California. But it was a culture shock for them. For my ex-wife, on the other hand, it was good in that she went to work, she went back to work having stopped working in '51. In '59 she went back to work in the Children's Division of the Chicago Welfare Department. That really had a salutary effect on her general affect. She was better—it was better working than not working. For me it cut back way down on the commute time, which was good.

By '60 I had finally finished my Ph.D. and now I'm at loose ends, because I'm so used to working night and day with no let-up that in a way I sort of didn't know what to do [laughs] with all that free time. So I became a bit restless. I had been doing contract research for almost five years. You get on the road—basically you're a salesman. You have got to sell and do research. It's nothing derogatory about it, people do do it, and everybody more or less has to sell. If you talk to a typical Berkeley faculty member, it's one of his big problems, is to get grants. So in a sense it's not really different, you just have different names, and you function in a slightly different way, but basically you're still always selling. Nevertheless, it's pretty crass [laughs] in the industrial situation. About every three months we, my section supervisor and I think there were two other guys, we'd get on the road with our little briefcase with one- or two-page ideas to propose project that we would like to work on and go to funding agencies, Wright-Patterson Air Force Base. And there was the Naval Ordnance Lab, or the Naval Research Lab in Washington. And we'd go up to Fort Dix, New Jersey, sometimes, Monmouth, New Jersey, rather, which was a big electronics center, and we would go to—now, where did we go to Boston, I forget where it was, somewhere around Boston, so we were kind of like traveling salesmen.

And it was fun at first, you have an expense account—but after a while it gets old. You also become a little superficial, because what's happening is that whatever—what you do is what people will pay you to do, and while it's still physics, it's still—you're learning the first principles of different subjects all the time. So after a while you're rather broad, but you're not very deep. That's why I use the term superficial. And I didn't like that, so when I didn't know what to do at the time, I thought of, "Well, gee, now I've got a Ph.D." One thing that occurred to me was to take off and go to Africa. Not to leave my family, but I mean go do something different. That came about because in the middle fifties, African countries began to get their independence. Ghana, and later Nigeria and other countries. And being in Chicago, and knowing intellectuals, I met

African people at the University of Chicago who would have these victory celebrations. And it was exciting, now that would be fun to go and help them. Well, I looked into that. As you can imagine, heretofore the colonialism has created very few jobs and leadership positions for Africans, all of a sudden you have got people confronted with running countries with very little experience or education to do so. So I can remember trying to find out, "Well, what's Africa like, really?" There were a few people around town, black people who had spent some time in Africa. A couple of them, one of them had been a reporter for the *United Negro Press*, I think it was, it was like the *AP*, *Associated Press*. But it was the Negro press, and he traveled all over the world reporting on things from that perspective. And I got some perspective there.

And there was one guy who had been the U.S. ambassador to Liberia, who gave me such a dismal picture of Africa that I wondered if he really liked Africans at all. He reminded me of this Indian writer [V.S.] Naipaul who just won the Nobel Prize last year who seems to hate Indians, if you read his stuff. He's really, he's very derogatory, and this guy was like that. He said, "Africans are lazy, they'll do this and they'll do that, for God's sake, don't ever get on their payroll." Well, that was good advice, of course, [laughs] about that payroll.

But anyway, the point is that, despite all that I started writing letters to Nigeria, the embassy, about opportunities for doing teaching and doing science or whatever. And I got such a cold shoulder that [laughs] I forgot about it, "Obviously they don't want me or fill out this form or whatever." So—but at about this time, now this is around 1960 when I had just gotten my Ph.D., not too long after that comes this inquiry from California, that my former boss, my thesis advisor who was approached, they were trying to hire him, but that was not interesting to him. He recommended me and that got me out to interview at Lockheed and got me out there.

Wilmot: Azaroff?

Bragg: That's Lee Azaroff, Azaroff, right, yes. Azaroff. Leonid Azaroff. Lee was a great guy. He was—I'm sure we'll get around to that—he said, "Look, Pete, they were asking me if I am interested. I'm not, but it looks like something you can do. And besides, why don't you go and interview, you get a trip to California anyway." So in the dead of winter when the weather is nice in California, it's not nice in Chicago. [laughs] So that led to being hired at Lockheed in California.

Up to that time I had, at the foundation, I had done my thesis on essentially x-ray characterization of nearly perfect, that is, nearly defect-free crystals. I had done some studies of small-angle scattering with model systems. In order to see how much you know, you set up a situation where you know what you put in and measure it and find out, and verify that that's what you did in systems. Plus work that I had set in motion while I was still at the PCA that had never been published but was in the mill, more or less—(sometimes it takes a year or two for things to trickle through). And some of that stuff got published. But anyway, when I arrived at Lockheed that was a godsend, because I was exactly what the ticket—I was exactly what they needed, and in a way exactly what I needed, because when Ed showed me the things they were doing, it was a busy place, I didn't like that, because the lab reminded me of a factory. But still there was lots going on. And instead of having one or two people on a project, they might have five or six, which meant you could really dig in and be thorough. I liked that part

of it. So if you were very good you could look at many aspects of the same problem. That's the only way you can get a really good understanding, because it's hard to tell what an elephant is like if you just grab his tail, you see. So that way you can feel his legs and his snout, and that's the way you have to do materials research to be successful. So I liked that. That was exciting to me.

The money looked good, the housing that I saw looked good, saw Eichlers that I really liked in Palo Alto and down in Sunnyvale.

Wilmot: You saw what down here?

Bragg: Eichlers.

Wilmot: Eichlers.

Bragg: It's a style of architecture that was very common then, very widespread. Very nice, I like—. Some of them were built back over in the East Bay, for that matter, in Hayward, and out in other bedroom communities. At any rate, the pattern of residential segregation wasn't nearly as severe as I was used to in Chicago, that I also liked, because now I was back like, in a way kind of like in Glencoe. But the whole thing looked—there wasn't a thing that I saw about it that was negative. So when I got back from the interview trip, it turned out my ex-wife, after she had gotten her bachelor's degree, was given a trip to Chicago to visit an aunt who was living in Vallejo.

Wilmot: A trip to California?

Bragg: Yes. She spent six months or so, quite a long time visiting in California. She liked California, so that I didn't have to persuade her to go, so I came out in '61. They came out later. I had to start the job, and find a house and things like that, and they came out when school was out. So all that took place from January through—

Wilmot: June.

Bragg: —June of '61. So it was a move I was very happy for. I arrived at a good time, when things were booming, I mean technically. I was needed, and I fell in with a good group. So that was another move that—I don't get that job coming out of the personnel office. It was the network. But it worked out just fine.

So that put me in California, in Palo Alto, in 1961. I enjoyed that because the initial arrival was good in that I had time to check around and find a house. And also work night and day to get caught up in the laboratory. That way, when my family arrives, I more or less got things ready for them, and the disruption is less of an issue that way than if we had all arrived at the same time. It would have been—well, I think it was better the way it happened.

Wilmot: Where did you settle in Palo Alto?

Bragg: We got a house in Palo Alto near where Gunn High School is now. It's about two or three miles from the Lockheed Research Laboratory where I worked. I lived initially was with a guy who was selling real estate in East Palo Alto. That came about because I

had a friend in Chicago who knew a guy in Menlo Park (a physician who became my family physician for a while), who was supposed to ask him to help me get settled. Well, he knew this guy dealt in real estate, so he said, "Here, why don't you hook up with Dan here, and—" The guy's name was Dan Everts. And Dan says, "Of course, why don't you come, and—" [laughs] He had recently separated from his wife, he was a bachelor, and I was too at that moment, effectively. So Dan was selling houses in East Palo Alto and wherever he could sell them. So for several months I lived with Dan, learning the neighborhood, learning the who's who, and what's what, and where's where. And we finally bought a house over in Palo Alto not too far from El Camino Real, if you know that area, and very near, about a half a mile from Gunn High School.

Wilmot: So that house you bought, you didn't rent at all?

Bragg: Well, we rented with an option to buy.

Wilmot: Interesting.

Bragg: Yes. The owner had just been appointed to a job in the Peace Corps. His name was Franklin Williams, he was a lawyer, NAACP lawyer. He eventually became the ambassador to Ghana, incidentally. But Frank had just gotten this Peace Corps job, so he was going to move to Washington and he wanted me to do something with his house. So he didn't have a sale right away, so we rented with an option to buy. In about a year's time we bought it.

Wilmot: And that was that integrated community?

Bragg: Yes.

Wilmot: Neighborhood.

Bragg: In fact, it was integrated in an interesting way. Frank had been the head of the West Coast region of the NAACP, he was a lawyer, as I said. A very good lawyer. He had helped write the constitution for the State of Alaska, for example. He naturally got involved in local politics, which meant the Democratic party, for black people, and got to know—Palo Alto is right next to Stanford, so we've got a lot of university types, a lot of liberals. And there were things, issues about housing were such that—it was still an issue of integrated housing. Right after World War II there was a builder named Joseph Eichler, E-I-C-H-L-E-R, who built these houses, which got to be called Eichlers because they are so distinctive, and tracts of these things. Nice ones, I like them. A distinctive kind of ranch style. When you see one you know right away it's an Eichler.

Well, Frank wanted to buy one, but Eichler at that time would not sell to black people in any of his tracts. But Eichler's son had been in the army and had gotten some very advanced views about democracy and all that kind of stuff, and he prevailed upon his dad, said, "Look, this is ridiculous." But his dad would only go so far as to say, "Well, look, if you find the piece of land, I'll build you a house on it. But I won't sell you one in my tracts." So [laughs] that's why you'll find this one Eichler in a neighborhood which doesn't have any other Eichlers in it.

Wilmot: That's a really amazing story.

Bragg: Well, it's true.

Wilmot: And that's the kind of thing that you don't find, you don't learn about, except in—

Bragg: —there's lots of curiosities. The neighborhood that it's in is just adjacent to one that's called Baron Park in Palo Alto. There are different subdivisions with different names to them depending upon when they were built. It's right within a stone's throw of a middle school, so that was great for us. But the important thing about the whole thing was, first of all it was a very nice place. It's an Eichler, Frank had made some improvements to it even, had built an office onto it; he was a lawyer, after all, and added an extra bathroom. So it now had three baths instead of two. And they had taken the garage and made it into a family room, which fully enlarged the size of the place, and took some of the adjacent land and made a garage. So it was quite a good-sized place. Nice, he had apricot trees, peach trees. And his wife was one of those *House and Garden* types that everything you saw in *Sunset Magazine*, which is a kind of a *House and Garden* type of magazine, flowers up the ying-yang, everywhere you looked—it was just too much work, incidentally.

The point is, it was a nice place. As I say, it was lucky that Frank happened to have gotten this Peace Corps appointment at the time that he did, so he was leaving. He was leaving in time for us to occupy the place when school was out, so it worked out just fine. Incidentally, my wife eventually paid it off, burned the mortgage. [laughs]

Wilmot: She paid off the mortgage?

Bragg: Not right away, but over time, yes. It was like a twenty-year mortgage in those days.

Wilmot: Now, why is that significant? That your wife paid it off? If she stayed there, okay.

Bragg: Well, we divorced. [laughs]

Wilmot: Right, okay.

Bragg: And she got the house. But the point was that most people—well, put it this way, it's not always that good of an idea to totally pay off a mortgage.

Wilmot: Because you can refinance and get paid a lot of money?

Bragg: Well, you've got an offset against—if you've got income that's taxable, then part of the interest payments that you make and all those things come as an offset against your income. So, one of the best investments you can make is to get a house with a mortgage, because you're constantly getting equity because it's always worth more, but you're also paying interest, and that offsets your income, so your taxable income, income after taxes actually goes up, whereas if you rent, it doesn't. So—but that's off the point. But it was the thing to do, and we bought the place, the kids had an instant acceptance in the neighborhood because Frank had children, and being an NAACP lawyer, any incidents of a racial nature had already been dealt with when we got there. So we didn't have to integrate the neighborhood intellectually or otherwise. They had already been conditioned to be having a black family there.

It turned out one family next door was Japanese, which again, that wasn't rare, there were lots of Japanese around there. But down the street we had neighbors who invited us to join their church, and they had babysat for Frank's family and did it for us. So we didn't have a problem with fitting into the neighborhood when we came to California.

Wilmot: I have a question about—you said you stayed initially in East Palo Alto?

Bragg: Yes.

Wilmot: And my understanding, I'm from Oakland so I'm not fluent in Palo Alto really, it's not my place of origin, but my understanding is there is this really intense segregation, basically, that that was like the area where —

Bragg: Well, it was, East Palo Alto—

Wilmot: Maybe it wasn't that way at that time?

Bragg: Well, no, when I arrived there it was highly segregated. Or to put it another way—well, go back. East Palo Alto Gardens, I think that's the name that was applied to it, the area where I was living—

Wilmot: When you were staying with the real estate agent?

Bragg: Yes—had first been built as a place for people, blue-collar white people who were living in places like San Francisco or up and down the peninsula here to have nice middle-class or so to speak neighborhoods to live in. It was a step up for them. They were not bad places, they were typically with three bedrooms, one bath, and a kind of an attached garage, they were nice little places. But it's on the other side of the tracks, it's on the, essentially, it's on the eastern side of Highway 101, the Bayshore Freeway, and that more or less put it on the other side of the tracks. Not only literally, but figuratively, but literally, in the sense of the tracks being the freeway.

But nothing wrong with those places for the money and whatnot, it's just that it was sold—and there was a fairly sizeable community too—to blue collar white people. Well, once that happened, of course, there's nothing to sell anymore. So what the realtors do in situations like that is introduce a black family. And now, if you do that soon enough and aggressively enough, you'll get to some point where the thing goes like wildfire. A few black families are tolerable. But a lot of black families brings terror, and white people just sell just to get out. So it's the first people who bought there, probably paid a high price, black people I mean, to live there. Because they are looking for a better place to live too. But as time goes on the people begin to sell, and after a while when the—as the complexion of the area changes, the—whether true or not, the dynamics change, and the changeover just goes like wildfire. And what Dan was doing was getting into this second round of white people selling their places to black people. So he would—they would, in fact, move out. They would leave a place vacant, and Dan [laughs] would move in, so the place would be occupied, and sell the house, move out to the next one. In fact he did that once [laughs] while I moved in with him. And I came home one day and I wasn't home, home [laughs] was gone. He had moved his furniture and everything and my stuff over to another house.

Wilmot: It sounds like he was a wheeler-dealer.

Bragg: He was. [laughs] But that was the situation in East Palo Alto, once it went over totally again, now almost all black, what happened is people now began to buy over their heads. They would pay exorbitant prices for places that they couldn't afford. So they began to take in roomers and things like that to—. That's what leads to neighborhood deterioration. And they went through a cycle of that, the drug people coming in. Now it's going through two more cycles, of Mexicans coming in and buying homes now. They can now—got to the point where they can afford places, to fix them up, after the drug lords come in and sort of got things off-keel. But in addition, Silicon Valley being right next door, it's hard to look over across the track there and say, "Well, I won't live over there." When all you have to do is go over there five minutes away rather than go thirty-five or forty or fifty minutes down to Gilroy. So sooner or later somebody's going to go over there and bite the bullet and begin to gentrify the neighborhood. And that's what's happening now. So that whole area is being gentrified now, and it's not what it was like at its nadir. It's better than it was at its zenith, for that matter. It's just unavoidable. You can't move the land, and so you just move the people. [laughs] That's what's happening.

Gentrification is—that's the way it takes there. In the urban areas, of course, what it is is people move into slums and revitalize, build up the slums. In every major city in the country that you go, I don't imagine you'll find one that's immune from that.

Wilmot: Did you watch that happen here in Emeryville? Though Emeryville probably couldn't have ever been categorized as a slum.

Bragg: Emeryville didn't really—I don't know the rest of the town. I moved here around '72, I guess. I moved here into this apartment complex which had been built a few years earlier. What happened in Emeryville was that it had been basically an unincorporated area with a racetrack, gambling, things like that. It was kind of crude. When Watergate was built, that practically doubled the population of Emeryville. Watergate has about 1,400 units in it.

Wilmot: When this complex was built.

Bragg: When this complex was built, when it filled up, it just about doubled the resident population of Emeryville. But at that time Emeryville was just a factory town where we have this Emeryville Market and all that stuff over there. There was a bunch of warehouses, trucking companies, steel companies, nothing but blue-collar stuff. Well, that situation was still there for a few years, and then when the Watergate went condominium, the owners, the people who had built this place had gotten to the point where I guess you could sell them as condominiums and make money again. [laughs] So when that happened, people who were here as renters who had paid no attention to local politics now became buyers and owners, and now they pay a lot of attention to local politics. What that did was to put in totally new ideas. The people in Watergate basically are white-collar, or retirees, people who work downtown or San Francisco, but would ride the Transbay bus, and never saw the blue-collar part of Emeryville. But when they began to become part of the landed gentry, let's call it, they got involved in local politics, got rid of the sheriff, got rid of the hacks who were the city council and whatnot. Artists began to move in, take over lofts and do things. And developments like

all those upscale stores that you see over there now, all that came about as a result of the change from rent to ownership, that was the follow-on for all of that.

Unfortunately it's gotten out of hand now. [laughs] You can barely move your car around, there's so much development that's going on that—the Ikea stores and all that stuff over there. Of course I'm not going to move, but I wish for the good old days when we didn't quite have all that.

Wilmot: That Ikea store is really overwhelming.

Bragg: Oh, I've never been in one. I don't feel like I've got enough energy to walk from the parking lot just to get in. [laughs]

Wilmot: Yes. So when you see that kind of cycle happening in East Palo Alto, is your sense that that's a cycle, and that's just what happens, or do you kind of—are you concerned about the folks who are being displaced, or—how does that—?

Bragg: Yes, that's always a concern. I'm not sure what the typical profile would look like, what the typical story would look like. There's no slums being built, as far as I know. The money paid for those places probably, if they're owned, then—and of course, they were mostly owned—probably meant people moving out to Tracy or someplace like that. Essentially, the net result is to move people further out. It's not basically a place where people go and rent. So if you're going to buy, then you buy where it's cheaper. I remember one time I had some loose change and I thought I might buy a place in East Palo Alto, just for the heck of it. Well, to have—

Wilmot: Investment?

Bragg: —some property. It turned out that those houses that used to sell for \$8,000, \$10,000, \$12,000, now you could sell them for \$100,000. Of course some years had gone by. But you see my point, that's the kind of money that's going, and you can take \$100,000 and go out to Tracy and have a mansion, practically. Comparatively. So, I think mainly that's probably what happened to those people. As it happened, you see, there was not a lot of rental property there. So it's not the same thing as land clearance in, say, San Francisco.

Wilmot: Interesting.

Bragg: At least I don't think so.

Wilmot: So your family—what time does your watch say?

Bragg: It's 1:05.

Wilmot: 1:05?

Bragg: Yes.

Wilmot: Okay, we have about twenty-five more minutes, is that okay with you?

Bragg: Yes, okay.

Wilmot: So Lockheed you've described as this very kind of—very factory, and an environment like a factory with a lot of really bright young people.

Bragg: An environment like a factory, what I meant was that I was used to—

Wilmot: I just picked up on that word, there were other things you said—

Bragg: Well, yes, in my mind I meant to say that.

Wilmot: Yes.

Bragg: I was used to situations where you had your own laboratory, or only a few people would be in an enclosure. But basically if you look at the aerospace industry and the way—the office situation, what I saw at Palo Alto was nothing compared to what you see if you went down to Sunnyvale where the manufacturing divisions were. You'd go in a room there and there'd be a row of maybe ten engineers' desks, like students' desks, but each one has his own desk and little bookcase and all that, and a phone, and at the head here is a section leader. There might be, you know, five or six of these. It was just like a big factory, not factory but—no privacy whatsoever. Luckily I never had to work in an environment like that.

To put it another way, in a matter of practically a day, you could convert one of those offices to a bare room with nothing but electrical connections in the floor. That's how primitive the whole terrain was. But back to—the lab at Palo Alto, it was sort of like that then—much more open spaces. So the noise level is a little higher. But the sense of property and responsibility is diluted. If you've got your own lab with your own equipment in it, then you kind of feel responsible for it. If somebody else comes to use it, they do so with your blessing and your supervision and so on. But in general, that whole sense of responsibility, I guess, or ownership was just changed. I found it wasn't unique. It's true all over the whole industry. But that was kind of a shock to me.

The x-ray lab was a little different in that because of the nature of x-rays you can't have a lot of people running around. X-rays are dangerous, after all. So it's a more well-defined facility and activity. But basically open structures, much more open than I was used to before, and as I say, it reminded me of a factory to some extent. So that I didn't like.

Wilmot: So how did that change your relationship to your research and your work?

Bragg: Well, as I said, I was running the x-ray lab. My immediate responsibility was running the x-ray lab. But I had an office. But the lab wasn't—it was self-contained, so it didn't bother me personally in the work that I was doing. But it was just the notion that that was the way it was.

Wilmot: I guess that's my question is, did that whole relationship where space suddenly, it's not necessarily collective but it's more like a factory, did that carry over into your research where your research no longer feels like it's your own, but it goes to, it belongs—

Bragg: I see your question—

Wilmot: It's kind of a funny question, but—

Bragg: Well, I see your question though. No, it turned out that it wasn't as bad as I made it seem, in that some equipment of course was so general-purpose that everybody could use it. Some would be rather special-purpose, and then nobody would use it unless it sat there for a long time, in which case it would get cannibalized and disappear. People would just take parts off of it. [laughs] That's the kind of thing I didn't like. But what happened was that in every case for a given project, the organization is that there is always somebody who is responsible for the activity. So this group leader or team leader has individuals who work with him or her on this problem. And everybody has to keep track of their time. I didn't like the time card problem either, but you do have to account for—you get paid for what you do. So you work so many hours on this and so many hours on that, and—roughly you try to keep track of what you do, for what projects. Because in the end it's costed in that way.

But the team leader has the responsibility of getting his team to achieve targets, achieve results that they've contracted to do. The contract says, "You will do this, that, that, and that and that." And to do that you need these kinds of people at so many hours and so on, and this kind of equipment and supplies. So, it's not as exact as one would like, but it's fairly—after a while you get to be fairly good at knowing what it takes to do things. And that's what a team leader's skill is, part of his skill is doing that.

Now, he or she will meet with the team at regular intervals. Each one within that team has their task. Some may work in small groups, but after all, when it's all said and done, they will meet at regular intervals, submit reports at regular intervals. These reports will get consolidated and then made to read like one person wrote it by the team leader. So it works out, after a while you get used to this kind of teamwork, and that's the way materials research is done. The stuff that I had been used to before, where you had one or two people, was really not team research. And it often did not have any much, a close relationship to, identifiable relationship to other aspects of the same problem. So you're kind of hoping that other parts of it will somehow materialize. But if you've got the whole picture, then of course you can make sure it goes along in a complimentary fashion.

So that's the way team research, materials research is done. It's highly—called interdisciplinary. So that means that you have to be broader, have to understand why this relates to that and how this property and that property and that property all derive from the same kind of structural model.

But my first assignment, of course, was not to do that but just to do x-ray work. But very quickly I was able to resolve some problems that had come up and they hadn't been solved. And that led to my promotion to group leader. Now I became involved in a broader set of problems. And that was fine because I was versatile.

Eventually, that—I'm jumping way ahead, but eventually the division director, the laboratory director got promoted to the corporate headquarters in Burbank. Ed Burke, who was the department manager, became the division director. And Ed made me the department manager. But that was toward the end, it was I think the last three years I was there that it had gotten to that point where I was department manager. But each time you're getting more and more diluted. The higher you go, the less you're involved in

details. So you're getting further and further away from the heart of the research, you don't have much time to do it, incidentally. You get involved in other things and you have to go to management school. Lockheed prides itself that—highly management-oriented. That Lockheed, not—I don't know what this is, Martin now. So I had to take courses in principles of supervision, and accounting, and control, and human relations, and operations research, courses like that. They would bring in faculty from the University of Santa Clara or someplace like that to teach these courses.

Wilmot: Was it interesting, or—?

Bragg: Yes, it was. A lot of it I already knew, but some of it I didn't. So basically I enjoyed it. But all that, you know, the point I was making was that if you become responsible for—first you're responsible for two people, that was me and an assistant, then I had five or six, then I had twenty, plus or minus a few. Well, every time you do that you have to change. When it was just two of us, there was no problem, we just talked to each other. When there was four or five, we'd meet once a week. When there's twenty, I had four groups, so I'd meet with the four group leaders once a week. [laughs] Now, I'm still cognizant, but not involved in a creative way, you see.

Wilmot: Yes, it changes it.

Bragg: Yes. And that got to the point where I finally realized that also every time you do this you've got a little more clout, you get a little more money, but when you're paid more money, they expect more out of you. And you get to the point where you are getting more money—let's put it this way. There's a young fellow coming along who can do probably 80 percent of what you're doing, and he's only getting 50 percent of what you get in terms of pay. So at this point the company has a real problem, how to do the next raise. So in effect, what you have to do is either go up or look to become obsolete and go out, because either you're—you get to the point where only a few people can afford to be compensated at an increasing—continue to receive a higher compensation, unless they're responsible for more people. So it means you have to essentially move up the management ladder, or look to have your salary flattened off and get stagnant. For some, of course, that's not a problem. If you do it right, you'll arrive at this plateau about the time you retire, [laughs] in which case it doesn't matter. But if you come along real fast, you've got to look to fifteen or twenty years of stagnation, unless you go the management route. Now, every organization tries to provide dual tracks so that you can be equally compensated, whether you're management or research. But none of them really achieve that. They try with various titles.

At Lockheed, for example, they followed the structure that many labs like Bell Labs had, where you were a member of the lab or a senior member, at Bell it was like member of the technical staff or senior member. They tried this at Lockheed, I was a senior member. But it turned out that some senior members had secretaries, the guys who used to be managers—they were one kind of senior member, the guys who didn't have secretaries [laughs] were another kind. They called them SMRLs, Senior Member of the Research Lab. We got to calling them A-SMRLs and B-SMRLs. All it did was rename things. [laughs] It didn't really change—well, it was all right, but the point I'm making was that you get to a point where you either go up or you go out. Or go aside. And I was lucky enough to have Berkeley come along when I had to really bite the bullet. It was time to bite the bullet.

Wilmot: Were you either going to—well, what were you going to do if Berkeley hadn't —?

Bragg: Well, I don't know, because that was at a point where my boss was younger than I was, so he is not about to leave. I don't see him heading up to the—he's not going to resign. And unless I left, went to go somewhere else, which I wasn't really curious about, I liked Palo Alto—it hadn't become a burning issue, but an issue that I clearly understood was there. And looking up to my boss, I was sure I could do his job, I hadn't seen anything unusual about it. If he could do it, I could do it. In fact, I probably could have done his boss' job, but I didn't want to be that far away from the research, which is what had happened to him. And it had to happen, I mean, it's unavoidable. So I was lucky that the opportunity to go teach came along when it did, because I could resolve that question fairly readily. I took the research route. And the nice thing about that is, once you teach your courses and don't get into any problems with moral turpitude or something like that, you can do anything you damn please in a research university, it's a great place to be.

Wilmot: Well, maybe we should close there for today.

Bragg: That's a great idea.

Wilmot: What time is it?

Bragg: 1:22, it's about time to stop.

Interview 9: July 17, 2002

Wilmot: Robert H. Bragg, interview number nine, today's date is July 17. Last time we met we talked a little bit about your time at Lockheed Missiles and Space Company [LMSC].

Bragg: It was part of the Lockheed Aircraft Corporation, it was a company within the corporation. The biggest, but still a company.

Wilmot: I'm going to ask you a little bit more about first the corporation, and then the field.

Bragg: Lockheed Aircraft Corporation had initially been just that, without a lot of companies. It had built airplanes to begin with, as far back as World War II. More recently they built things like the Electra, which was the fastest plane afloat just before the pure jet airplanes came in. But when the space program really got big, companies who were dealing with aircraft, airplanes, began to get into the space program, like Douglas, like Boeing, and Lockheed of course. And so they formed the Missiles and Space Company, which eventually grew to be the biggest company of the corporation. At one time the corporation had about 90,000 employees. While I was there we had about maybe 30,000 at LMSC.

There was another one, at Lockheed, Marietta in Georgia, which built military transport planes like the C5 which are big enough to put six Greyhound buses in one of those planes. There was another company at Burbank that built fighter planes, and stealth—like, well, the U2 was a Lockheed Aircraft plane, the SR71, flies to 70,000 feet up in the stratosphere practically. So it built all these things, and the Missiles and Space Company was hot then, in the sixties, when we were constantly having these missile development programs, space programs, and Lockheed was a part of that, the LMSC was a part of that. There were major divisions, one which built missiles, and one which built spacecraft. Our part of that was the research division, which did research for all of it. Actually, R&D, and I was part of R in that, within R&D.

Wilmot: The research.

Bragg: Yes, which was about 600 people I guess, roughly, out of 2,000. Our site was in Palo Alto as opposed to the manufacturing divisions and the development divisions which were in Sunnyvale and other places around the Bay Area here, mostly in Sunnyvale.

So the research lab had four divisions, four laboratories within it, looking at things that were relevant to the whole company's business, missiles, spacecraft, but more in terms of scientific disciplines, electronics, materials. There was one that did propulsion I think, and I forget what the other one was. But there were four of these labs, laboratories, each one had a director and departments within that. And ours was with the materials science division. My department within that was, I forget what it was called in the beginning. But anyway, that's how the organization chart broke down.

Wilmot: I know you were director of your group, how many groups were there in each laboratory, did it break down like that?

Bragg: Well, each laboratory would have maybe 100, 150 people. In the materials division, we had chemistry, which was a separate department, there was metallurgy, there was propulsion, and there was another one, I can't remember what it was now. But altogether there were about 150 people in our laboratory, which had a director. My particular department had about twenty, twenty five—metallurgy had about twenty, twenty-five people. So when I became department manager, that's what I inherited, about that number, people who had been my colleagues beforehand. I'm not sure I'm responding to your question in the detail that you want, but—

Wilmot: I haven't asked the question yet, though I'm ready. But—

Bragg: Trust me to go ahead. [laughter]

Wilmot: Okay. As I understand it, you were working with different carbon materials that were very close to the engine of the rockets which would then re-enter the atmosphere—?

Bragg: Well, [laughter] why don't I back up and fill you in?

Wilmot: Okay.

Bragg: That I did, along with other things. The progression was to come in just as a specialist who understood x-ray diffraction by materials. And the point of that is that no matter what material it is, the most important ways to characterize the structure of that material is first with the eye, just the naked eye, then low-power optical microscopes, then higher power, and then things that look at the atomic level. Up to a certain point with optical instruments you can see very small details. But after a while you get beyond the capabilities of the eye or even lenses, and then you have to go to things that are either inferential, like x-ray diffraction, or see directly, like electron microscopy.

So my original role was to run the x-ray diffraction laboratory, with a technician. And after a while we upgraded that technician job to another scientist. At first I just got involved in diffraction by all the kinds of materials that we looked at. They included metals like beryllium, exotic things like beryllium metal that most people have never seen. Steels, aluminum, refractory metals like molybdenum and tungsten. Ceramics of all kinds, mostly aluminum and silica. And plastics. And carbon.

And the reason for carbon was that carbon is the material of choice for re-entry heat shields. The common slang is nose tips; the idea is that you think of a missile as something shaped kind of like a sausage or cone. The front end of this as it re-enters the atmosphere, it has a warhead in it usually, but it has a shield around it because when it re-enters at such high rates, it tends to get very hot. It gets very, very hot, and in fact will volatilize to a certain extent, will just essentially burn up. So what you want to do is to suppress that degradation. And carbon turns out to be the best possible material for that purpose. Per pound it will do better than anything else, any natural material. But even then, carbon is carbon is carbon. For example, lampblack, which is used to blacken shoes, and in pigments, paint pigments—it's the most common ingredient of black paint—that's carbon. But your lead pencil is not really lead, it's carbon. So there are all kinds of carbon, and so the form in which you put the carbon is going to be very, very important. So I got involved with those issues then.

Wilmot: What I'm trying to understand is, while you were in your lab and doing this research, was it generally you were doing research and then somewhere out in the universe you understand that this is how it would be used and you were working towards that end, or was it even more kind of exploratory than that?

Bragg: When I arrived, when I first got involved, my involvement in the universe that I saw, the world that I saw around me was pretty narrow. We have a material which somebody has decided—somebodies have decided that in certain form, it is going to be the cure-all, or at least solve the problem of the missile surviving a re-entry having flown up through the atmosphere and now it's going to come back in and kill somebody. Issues like how many are killed and all that, those are not issues that I had to deal with. What I had to deal with was the technical problem of just determining for the people who were involved in the development what the structure of the material was using x-ray diffraction. My first responsibility was only that, not the other properties. So that meant that I had to get involved in learning how to do characterization of carbon materials that would be useful to people who had to interpret this and use this in modifying the parameters that they used to make it. We had vendors like Union Carbide, General Electric, Sylvania—some of those don't exist anymore, I might add. But there were lots of companies that sprang up, plus older ones—DuPont—who had large chemical divisions, that for contracts by the navy would make the material for what the navy said it wanted. So somewhere there are engineers who designed all this who then expect to have certain specifications met. Now the manufacturers have to come up with materials that meet those specifications.

So our job, since we did not make anything like that—we fabricated the missiles, but the original materials were made by other—by materials companies. But in materials development, usually you start with a material with a property that at the moment doesn't exist. It's like saying, "I need a steel that's so strong that it will support a weight of a million pounds. But right now we've only got steel that will support half a million. But we designed the missile for the million-pound steel." So the idea is that somehow there is experience enough to know that if we put enough money in, put the right people on it, we can get that million pounds. So that development's going on while other things are happening. When the missile is first conceived, you've got properties which I've often called "unobtanium". [laughs]

Wilmot: Unobtanium. [laughter]

Bragg: Which was not quite, because you do believe you can reach those properties, based on prior experience, guesses, and some theory. Most materials, for example, are nowhere near as strong as they theoretically could be. So the idea is, how do you go about boosting that number up?

Now, to do that you have some idea how these properties can be improved. You do this in the chemistry and you do this in the processing. And if you're right, then it should happen. So what you do then is to say, "Well, what you should do is cook it a little longer. And if you do, then the properties should improve by this much."

And what we were doing then was to keep the vendors honest. In other words, providing our people with the results of the changes that the vendors were making on sample materials, let them know did they really achieve a change, and how much, and

so on. So that was one of the major functions that the laboratory did, just like a—not a sheriff, but a watchdog. That was one function that we did. To keep vendors honest so that they didn't cheat us and didn't waste money.

Wilmot: Did the vendors have their own laboratory?

Bragg: They did. We usually knew our counterparts, too. But they didn't always have the same level of skill in every field that we had.

I might add one thing further, and that is that we're dealing with companies like Union Carbide, which made products by the ton, multi-ton, and they might not sell us but half a ton. So they're not going to put a lot of their money into process development, it's not worth that much to them. Besides, they're not specialists in what we want to do. So it made more sense for us to tell them what to do to their processes, and let them do that. If they did that, fine, that's all we wanted them to do. Now, they're not going to invest a lot of money in something that's not going to bring a lot of money to them. So that was why the research lab operated that way.

Well, at first that was only concerned with whatever came into the laboratory, whether it was steel or beryllium or carbon or whatever. We had to do the diffraction work on that and interpret it for people who requested it. But as I said, not long after I came there, I had the good fortune to solve a couple of problems that had come up that had puzzled my boss, Ed Burke. And generally I guess I impressed him enough that he made me responsible for a small group of guys who were graduate students at Stanford and Berkeley. From there I necessarily got involved in more things. Then I became the head of the materials analysis group. Yes?

Wilmot: When people said they want a material that can do this, that has this property, or this natural property of the material is heightened by this degree so that it can do these wonderful things, where did those mandates come from? Or more like research increments, where did those come from?

Bragg: I'm not sure quite the question, where does the request come from, or where does the belief that it's possible come from?

Wilmot: Well, I think that the question I'm asking is where does the request come from, but if that second answer is also something you'd like to share you can, but I think the main one I'm asking is where does the request come from.

Bragg: The request comes from the people who design the missile in the first place. Whatever they have, whether it is an airplane or a missile or a dirigible, it doesn't matter what it is, somewhere there is a place where the grand picture exists. For example, Reagan had this notion of having a missile shield around the country that you couldn't shoot a missile in because we could shoot it down before it got close to us. Turns out it won't work, and everybody has said it won't work for years, but they're still putting up money to try to do it. But for physical reasons it turns out that the best physicists who've looked at this say that it won't work. "But if it would work, the things that you need to shoot it down would have to have these properties." Maybe that's not a really good example. But the point is—.

Let's say that we're concerned with a missile that cannot weigh more than X tons. But it has to do certain things. Inside of it has to have a propellant, which makes it go, it has to carry a warhead, it has to carry avionics electronics, which is—it's a flying electronics laboratory, even though it's got bombs in it, you see. So the question is, if that's the case, the propellant only knows it's going to propel so many pounds. But the structure has certain physical requirements. It has to have a certain strength; it has to have a certain stiffness. So now you have to look at all those properties and decide, "Well, what are we going to make this out of? And do we have to make it all out of that, or just part of it? Do we make the skin out of steel and the rest of it out of aluminum?" It turns out that by the time you're done you'll have half a dozen different kinds of metal and plastics in it, each one chosen to optimize weight, strength, things like that.

So these are things that are done back in the engineering design stage, where the engineers know enough from what's existing now and from consulting with experts in the various fields, "Yes, it can only be this strong, but could you go 10 percent more? We don't have it now, but can that be done?" And if the word is yes, well, they design for the extra 10 percent. Now it's up to the lab, the manufacturing people, to get that 10 percent. Now they go out to their vendors and try to direct them to get that extra 10 percent.

I think that's probably the answer that we're talking about. From a design phase that's what specifies what's to be attained, and it's up to the laboratory to do it. Usually with consultation back and forth, I might add.

Wilmot: And then as you've mentioned, you kind of rose rather rapidly through the ranks to become a group leader and a department head. As that happened, as that occurred, how did your vantage point in relation to the people who were handing down these research dimensions change?

Bragg: Oh, okay. [laughs] Well, at first they don't even know you. They're in Sunnyvale, or even further back, maybe in Burbank, and they only know there is somebody up there in the lab who does stuff. At various times you may wind up as an expert, testifying or giving reports on something. So they might see you in that circumstance. But it's only when you get to the point where your level of expertise is critical for whatever they're doing, the closer that comes to be the case, the closer you'll get to the powers that be.

Let's see if I can give you an example. One time the Lockheed California company, that was the one that made aircraft, sold some Electras—P3's, I think they call them—it's the grandchild of the Electra commercial airplane. Long after they took them out of use flying people, they were converted into flying electronics laboratories, and now they fly up and down the Pacific Coast. It's like an early warning picket line, like guards, and by means of sonar and things like that, detect submarines and everything else that's flying out there. Their ability to go out and stay out a long time on station before they have to come back and get gas and all that is what makes them useful. Our government has them, they're called the P3, I think it is, and they sold some to the Australian government, and the Australians home sent guys up to learn to fly these things, right down here at Moffett Field below Palo Alto, in Mountain View.

Well, after, oh, three or four take-offs and landings, one of the planes crashed, the landing gear broke. Well, that thing is supposed to withstand hundreds, if not thousands

of landings, so that's a big problem. And right away, even though we were not involved in any of that, we happened to be closest to where the accident occurred, and the corporation had the best research laboratory. So we were asked to look into it and find out what happened. In a matter of—it's remarkable, I had never been in an exercise like this before, a failure analysis. Some of the landing gear that had broken was brought in. Our metallographer, he's the guy who does graphic things with metals, had made sections to be studied, with all these techniques that I mentioned, the optical microscopy, the viewing of a highly polished surface at a thousand magnification. We did x-ray diffraction on them and so on. And hardness testing, all these were tests that were possible in the analysis group.

We were able to pinpoint the fact that the gear had failed because when the landing gear had been machined, a slight crack had been left in the part, and as stress was added to this part, the crack propagated and it broke. But they could even trace it right down to the particular lot that had been done, to the person who [laughs] had done that job. It turned out that not only was there a crack, but it had been overheated. So a couple of things had gone wrong.

Well, that's why they get highly paid, to be able to do that kind of analysis. Understand that the place where the parts were made had records too, they had to keep track of who did it and what the conditions were. Everything is documented. There's a lot of paperwork that goes with that, but that's to guarantee the quality and safety and so and so. The point is that once that's done, all of this is written up in a report, which is now handed up to me, which is then handed up to my boss. He then goes to a kind of a top engineer at Burbank, who asked the question in the first place. Now, depending on the level of sophistication of the question, either my boss would answer it, or if he needed more detail and understand it even better, he would ask me. I might accompany him there and just sit there—he's giving a talk, he's got his pointer and all that, but if he runs into trouble he—. [laughs] It's like you watch these congressional hearings, the congressmen sit there, but the guys [laughs] who know what's going on are sitting right behind them. Those faces you see, they're there because they need them. [laughs] They're not there just for show, they're there because they really know. So that's the hierarchy of it. I hope I've answered the question.

Wilmot: You have, and I'm going to ask a different question. Again, as you went up through the ranks to become head of your own department, to what extent did you start to help, if one did in that capacity, start to help shape the questions that people were asking?

Bragg: You are always doing that. There are two ways that happens. The lab has several functions. One is the watchdog function as I mentioned, and that is, you keep people honest. Another is to do process development to some extent on existing materials. That is to say, this engineer wants to use a certain steel. Now, he has handbooks. God, you should see the handbooks these guys have. Rows of them. Handbooks and also manuals or catalogs from everybody who makes anything they might want. And they have to become familiar with not only—either know them very well, or how to find them, and be able to get vendors on the phone, they can call to get quick answers.

And we also had what was called IR money, independent research money. That was money that was mandated by the contract from the government. Now, our most common customer was the government—either the navy, or the army, the air force, or

NASA. That a certain percent of all of the grants, the contracts—these are multimillion-dollar, billion-dollar contracts, mind you—but a certain small percentage of that money was made available in the divisional laboratories to do research that is relevant to the industry's needs. It's sort of like back at the PCA in that they didn't tell us what to do.

But the information on properties they want doesn't exist anywhere. And the question is, "All right, if that's the case, but maybe the reason why we don't know that property is nobody ever tested it at that temperature." Quite often it would be, "Can you work it at this temperature?" It normally was made to work at this lower temperature, but almost always we're working at higher temperatures. So the question is, "What will be the properties at this higher temperature?" Well, that kind of question we could answer. We didn't sit down and calculate it. They would give us a budget, we would say, "Well, how much would it cost to find out?" "Well, let's see, we're going to need Smith and Jones and Brown, it's going to take about so and so." We'd say, "Well, it's going to take \$30,000, we'll do it in a couple of weeks." Or something like that. So they would transfer that budget up to us, we'd put some people to work on it, and they'd go out in the lab and do the measurements, and come back with the report. So we worked in that capacity. That would be a project that might take anywhere from a few weeks to a few months.

But the idea is, we know the kinds of problems we have. And now your job is to try to take this money and come up with either new ideas, a new phenomenon that can be—and you don't know exactly when, because you don't know what you're going to find. But presumably it's going to lead to knowledge that has a chance of being useful. So the IR money, and that was where we would try to take our most creative people and give them IR money, because they are more likely to do something that's new and different than people who are just run-of-the-mill. So we had those three different ways of functioning: failure analysis, essentially, short-term research, or rather long-term research, the IR money.

Wilmot: And were there times when you just said, "Listen, this idea that you have, it's not going to work. The material doesn't have that capacity that you think it's going to have."

Bragg: Yes, now, understand, the person who gave us this money to find out if we can make the steel stronger, he doesn't control the IR money. That comes somewhere up here. [gestures] On occasion we might say, "We think that we can solve the problem you're trying to solve just better than Union Carbide." Now we're talking about serious money. Now we're talking about a few months, man-months, we're talking a few man-years.

Wilmot: Man-years?

Bragg: Man—it's one person working for a year. That's the way the budget talk goes.

Wilmot: Okay. Man-month, man-year.

Bragg: Yes. Or man-hours, even so. I mentioned glassy carbon last time. Glassy carbon had the property that, in tests of small pieces, it would resist volatilization better than anything that had ever come down the pike. But these were small pieces. And so it sounded like, "Well, if that's the case, it would be better than anything else we've seen. But it's brittle. Also, it's only been made in thin pieces. Can you make it in thicker pieces, and will it be

so brittle that it will crack easily, in which case it's nice, but it won't work in that application."

Well, what we did voluntarily was to just take some loose money—you can always hide a few thousand dollars—and run tests on the small pieces. And with that information, went to our customers in the manufacturing division saying, "Look, you've got Union Carbide working for you, you've got GE working for you, and you've got Sylvania working, making these various different concepts and materials. We don't think it's a great chance, but we think it's worth looking at trying to make these noses out of glassy carbon." They said, "Well, who makes glassy carbon?" "Well, right now, Tokai Chemical Company makes it." "Where is that?" "That's in Japan." "Well, we can't do that." "Why is that?" "Well, if we make the material out of glassy carbon, and its properties are known, then an intelligent engineer who understands re-entry will know exactly what the missile is supposed to do. They know the shape, and they know the material and the properties, and they can predict trajectories." So that meant that it had to be classified, which meant that we couldn't hire any foreign vendor to do it. So the alternative is, "Well, why don't we just do it?"

Now, normally we didn't do that. But for the purposes of this missile—and our relationship was good enough that they trusted us—we got a good-sized program to learn how to make glassy carbon from scratch. Didn't know how to make it at all. Had some ideas, but—.

And we did, we made it successfully. It took a while, and had half a dozen or more people working on it. Did a lot of things that were wrong, built processing chambers for high temperature when that wasn't what we needed at all. One of them was like a big high-pressure thing that they had to bring in all kinds of engineers to proof-test it and so on. It was wasteful, but like many programs like that, almost all of the rushed ones are wasteful. Haste makes waste. And actually, most military programs are. They tend to waste a lot. So we did a lot of things that don't come out, that hindsight tells you you shouldn't have done in the first place. But that's neither here nor there. That's the nature of the beast.

We learned how to make glassy carbon, make it better than Tokai, or at least as good, you couldn't tell the difference. Then when we made the noses, what you would expect happened. They didn't stand up at all, they just fractured. Nevertheless, that's one case where we told our sponsors, who were responsible to a higher authority, but they were depended on to have good judgment. They got the navy to give us the money to learn how to make glassy carbon, and make glassy carbon cheap.

Well, the knowledge now is resident in the department, and we tried patenting the material. It turns out that we ran into so many problems with patenting, we just licensed the process to a company in North Hollywood that may still be in existence, I don't know. But we learned how to make glassy carbon, and that was a case where we originated not the original concept of glassy carbon, but the idea that it might have a use for our purposes, and then we went ahead and [laughs] showed that it won't.

Wilmot: You said you worked with this young group of men, or young people from Stanford, who were graduate students at Stanford. What was that experience like, being the leader of that group?

Bragg: It was a lot of fun because they are all young—I was somewhat senior to them. By now I'm forty years old, they were in their twenties. But they're young guys, they're all very imaginative, and they're all very bright. So we met about once a week, we would go out and have drinks. I'd pick up the tab, naturally. And to the extent that the research they were doing was coming partially out of our pocket, Lockheed's pocket, I had to keep one eye on what they were doing, and dip in here and there. Understand, once they are doing research on a doctoral dissertation, they have a faculty sponsor at the university. They work together, along with us, on a problem that is mutually interesting to him and to us. By him I mean the guy at Stanford or at Berkeley. So we have a vested interest in what they're doing. But he is the guy who is going to be the one that has to sign off on their Ph.D., not us. Nevertheless, we do have to make sure that our money is being well spent. So that meant that it involved me in studies of diffusion, studies of creep and steel and things like that that I never would have had to fool with or bother with ordinarily.

But that was all good, because I had never been educated in materials science, you see. I learned all materials science on the job. It's not hard if you've got a good, proper solid state physics background, which I did.

Wilmot: While you were leading this group, what did you feel was important in terms of management, and what kind of environment did you feel it was important to provide? If that's a fair question.

Bragg: [Pause] I didn't think a lot about it, except that the whole of my experience in research had been, well, from my very first case, would be a low level of anxiety. Sure, you wanted to work, to get work done and get good results. But the important thing was to enjoy what you were doing, and not worry too much about looking over your shoulder, that you mustn't put your feet on your desk for fear somebody would think you were lazy. Sometimes you make more money for the company with your feet on your desk and thinking than you would sitting there cranking out numbers. Sometimes you need to just think. So it was, I guess by example, and also by being a good critic, "You tell me what you're doing, I can ask questions, I can understand what you're doing," that interplay is very, very useful. I think they use the term "bouncing ideas off of people." I was a great bouncer, [laughs] a wall to bounce things off of.

And so they got encouragement from me, they got useful suggestions, sometimes, or at least useful criticisms. And that worked out very well. So we had great relationships. Many of them actually are retired now, by now. This was quite a while ago, you know. That was in the late sixties, that's thirty years ago now, so many of them are up around retirement.

Wilmot: Are there any of those that you recall in particular, any of the young people that you worked with from Stanford, do you remember them? And their trajectories?

Bragg: Chuck Packer at Stanford was one, he may still be around, Charles M. Packer, Chuck Packer, who finally wound up—he worked for me very closely for a while, actually was my assistant. But worked on, I guess the problem had to do with—I forget what his problem was at Stanford.

Oh, I might add, this puts you into contact with the Stanford faculty as well.

Wilmot: What was that like for you?

Bragg: Often we hired them as consultants, which made it nice for them and nice for us. Oleg Sherby was one I remember in particular who was quite—

Wilmot: Can you say that name again?

Bragg: Oleg, O-L-E-G. His name was probably Sherbeshev or something like that, but shortened to Sherby. John Shine, then there was a guy who died in a plane crash who we had used as consultant (Alan Tetelman). But we got to know all of these guys by virtue of having our students over there. We were the closest materials science department around, so it's just a natural connection to have, it's very convenient to have, too. At any rate, that was in a way synergistic.

Wilmot: I have a question also about trends in the aerospace industry and defense industry that—and I'm conflating the two, and they're somewhat connected—but that affected the directions that your research took, or just your work life. And that's a vague question—

Bragg: Yes, and it puts me higher on the hog than I would belong. I was at Lockheed from '61 to '69. I don't remember any outstanding example of a striking new technology that came along during that whole period. Dramatic things don't happen all that often.

There was one thing that did happen, which sort of burst like a meteor for a while, and then settled back to, if not oblivion, certainly it didn't turn out to be the Great White Hope. That was what was called splat cooling. What it is is if you take a metal, you heat it up and melt it, and you freeze it under ordinary conditions, you will get certain properties. But if you freeze it very, very fast, then it may have rather different properties. In fact, usually it will.

Now, the “splat” name part came about, came about because the first guy who did this, out of curiosity, “What will happen if I take this alloy, instead of freezing it in the usual way, freeze it very, very fast. It may be actually that the alloy has, say it's got a little titanium in it, and it only holds so much titanium under ordinary conditions. After that it will precipitate out. But if I cool it very fast, maybe I can retain more titanium, in which case I might get an enhancement in some property.” So what he did was to design an apparatus whereby he would have a rotating wheel, which is cooled, a cylinder actually, like a tube, spinning very fast. Now you have this metal, like in a spray can, and you spray this metal onto this rotating tube, and you can see that it was kind of a splat when it hits the tube. But it doesn't freeze in a glob, it freezes in a thin film. So rapid solidification and a rapid freezing in many cases did produce rather striking changes in the chemical composition of the alloys, of its properties like strength or stiffness.

And that was held out to be—if not the Great White Hope, because it only made thin pieces of it, but under certain conditions you could get unusual physical properties. But that's one of the few things that happened in the traditional metals field that I'm aware of during that whole period. Normally it was just incremental changes, you do a little more, and next year it does a little better. A good example would be aircraft engine materials. The hotter an engine runs, the more efficient it turns out to be. So quite often the jet engines run almost white hot. But after you get them much hotter they just melt or, they'll soften. So the idea is to retain strength at high temperatures. And I forget the

name of the alloys that do this, but they're a very common alloy field of study by a limited number of people who specialize in that. That continued to go on, I'm sure it's probably still improving to some extent.

But otherwise, things might come along. For example we worked on an alloy which got called Lockalloy—Lockheed—Lockalloy, which was an alloy of berillium metal dissolved in aluminum. The idea is that aluminum metal isn't very strong compared to, say, steel, and it isn't very stiff either. You can take an aluminum can, after all, and crush it. If that can was made of steel at the same thickness, I don't think you could do that as easily. But you can reinforce metals with a stronger metal in small amounts, and improve the strength of the softer part. In other words, you can enhance properties like strength by deliberate addition of other metals, properly chosen, of course. And it turned out that an alloy of aluminum and berillium looked very promising. And we actually developed Lockalloy there in the laboratory. That was before I became the department manager. But I remember we got involved with Berillium Corporation, which made berillium metal, a joint venture with them. In fact, I even bought some of the stock. It turned out it didn't prosper. [laughs]

So that happens on occasion, but there was no dramatic change, and as far as I'm concerned, I had no cosmic influence on the field whatsoever. If you're searching for my imprint on the field, I don't think you're going to find it.

Wilmot: More, I'm trying to understand how the field responds, and you answered my question, how the field kind of responded to either technological innovations and political trends. So those were those two things that I was kind of thinking about, so you really spoke to technological innovation, which I really appreciate.

Bragg: Yes, as far as the politics are concerned, as far as I saw things, I don't think Lockheed had any—Lockheed was responding, its fortunes went up and down as was common with the missile industry. But in general the decisions that are made by the war department or NASA were influenced by what it was felt we could do. By “we” I mean the industry. It didn't really matter whether Lockheed could do it or Boeing or whoever could do it. When the time came to do it, a competition would be held, so sole-source is usually not done. It might turn out that one group, one company had such an advantage that it might as well have been, but they were still required by procurement rules to give other people a chance to compete.

For example, back in the early sixties there was a hue and cry to get a supersonic transport, the SST. And it was felt that no aircraft company right then was prepared to put up the money to build an SST, it would need government help. In the same way that the British and the French government went together to build the Concorde. So the question then was, “Well, those guys have got the Concorde, we should have our own SST.” Well, the contracts were let to bid. You'd get paid just to bid on the SST. Well, naturally, you're going to put your own money in too, because you want to get the contract. Lockheed was in there too. I remember, the SST that the British-French made only flies at slightly over Mach One, because the skins are made of aluminum metal, and aluminum will soften if you get much hotter, so it can only fly so fast and so high. Well, in our case the idea was to fly hotter and higher, which means you bring in titanium metal. Steel is too heavy; titanium is the metal of choice. It's corrosion resistant

as well, you don't want any rusting, that's why you make parts out of it. If you want something really corrosion resistant, you use titanium.

Well, Lockheed got into it. Lockheed had not built a successful commercial plane since the Electra, which is back in the late fifties. And even before that, the Lockheed Constellations, which are great prop planes, but—. In other words, they had been out so long that Boeing had a better idea of what commercial aviation was about than Lockheed did. Nevertheless, Lockheed bid on the SST. The choice came down to use of a certain titanium alloy. Boeing, other companies like Douglas, McDonnell Douglas and all that, they just were not in it really, basically it was Lockheed versus Boeing. Boeing bid the use of one alloy; we bid the use of another alloy. We lost. But the SST was never built.

An interesting spin-off, though, was that in the process of doing this, Lockheed got involved with the Rolls-Royce Aircraft Company—the Rolls-Royce Engine Company, actually, which makes engines and cars. And I remember this bunch of guys coming over from England. I thought the English were kind of conservative until I saw [laughs] this hard sell that these guys were—. They were making an engine; it was called the RB-211, that featured carbon-reinforced plastic blades. That's where I came in, you see. That part of the engine was supposed to be the big deal, that this Rolls engine was going to do all of these great things. [laughs] And of course they were over here pitching their HiFil blades in this RB-211 engine. As I say, I was quite surprised to find that they were capable of just as much of a hard sell as we were.

Well, historically it turns out that for any number of reasons, mostly concern about the pollution and all that, noise pollution and other things, that SSTs don't fly over the country. They fly in and out of the East Coast, but not—it was never built. The interesting fallout from that, though, was that the engines that they were going to build were so powerful that somebody at the Lockheed headquarters said, "Wait a minute. If these things are that powerful, instead of flying supersonic, we could use them to fly subsonic, and make much bigger airplanes." And so that is what led to the design of the L1011, which is still flying now, the rival to the Boeing 747 and the DC10, for example, they are comparable. None of them fly as fast as the 747 [laughs] so—. But that led to the design of the L1011, which at that time was going to be so roomy that it would be a joy to ride in them, and they were at first. They had mock-ups of the cabin. Two seats on the window, aisle, only four seats in the middle, and then two seats, so it's eight across. That way you're never more than one seat from an aisle. Well, naturally, once they were built they started [chuckles] crowding them in. Now you'll find three and four. But initially it was supposed to, "Oh, this is going to make flying great, because now we've got all this power, and we don't have to crowd people all that much to make money." So the moral of that story is that no matter what you do, you're going to lose. [laughs]

Wilmot: Let's take a break, okay?

Bragg: Yes.

[interview interruption]

Wilmot: When you were working with Lockheed Missiles and Space Company, am I correct in thinking that the other big players were Boeing—?

- Bragg: And Douglas.
- Wilmot: And McDonnell-Douglas.
- Bragg: Eventually McDonnell and Douglas combined, but Douglas was a standing entity. The DC10s, DC3s go back to World War II. So Douglas was big at one time. McDonnell came along; they eventually merged into McDonnell Douglas. But basically then it was Boeing, Lockheed, and Douglas.
- Wilmot: Did you have a sense that there were other African American persons who were operating at the level that you were operating?
- Bragg: No. If there were, then—
- Wilmot: In the field?
- Bragg: Yes, I think I know what you mean.
- Wilmot: Yes.
- Bragg: If there were, I probably would have known about them. You see, you have forums where people get together, we're talking about materials people. And you have the AIME [American Institute of Mining and Metallurgical Engineers], the American Ceramics Society, and I'd attend those meetings. I made it a point to always be active professionally, which meant that you go to meetings, you would present papers if your company would let you. But you get to know people in the field, both in industry and in academia. So you would get to know all of them. If they're at all active, you would know who they are, you would know them. And so I knew I was essentially unique in that field.

Actually, what happened was while I was at the foundation, I still went to meetings of the American Physical Society. And continued to do that a little bit once I got to Lockheed. But then I discovered that the things that were really of interest to us were more likely to be dealt with in meetings of the relevant professional societies. In the case of metals, there's the American Society of Metals, ASM. But at a level of sophistication we dealt with the AIME, the American Institute of Mining and Metallurgical Engineers. So, and then in the case of ceramics it would be the American Ceramics Society. So I made those meetings and I got to know people in those fields. And after a while I stopped going to meetings of the American Physical Society because it wasn't that interesting, it wasn't that relevant to me. As a matter of fact, that's why the last ten years I've discovered there are lots of young guys who were just coming along in physics when I stopped. They missed me because I was gone when they came in, they wonder where did I come from, and I wonder where they came from. I'm talking about black guys. But I was unique.

I was so much so that we would get visitors who would come to Lockheed—I might add that the division director who was a graduate of MIT, Maurice Steinberg, a million ideas a minute but way off, he would bring in consultants, typically from MIT, guys who had been his professors before, in a way kind of showing off, I guess. But they liked to come out to California in the wintertime because it was so cold in Boston. [chuckles] So we

would get these consultants coming through, and mostly we'd know what we were doing better than they do. But you have to play kind of a game where they try to look like they're helping you, and you have to kind of look like you appreciate it. Some of them were sensible about it and didn't make a fuss, but some of them really thought they were there because we needed them. Sometimes that might be true. But usually, a time when you need consultants—there are two times you need a consultant. One is when you don't know anything, in which case you need a real expert to get you going on the right track without wasting a lot of motion, making mistakes. The other is when you know so damn much that there is nobody really except the very best who are prepared to be critical of what you are doing. So anything in between is no help to you.

So most of the time we would get useful comments, criticisms, but hardly any new insights. And not surprisingly, if you're good enough you shouldn't be getting that many insights. But the one insight that they would get would be, "Who is this black dude here?" They wouldn't say that—well, some of them said it outright. This led to an invitation to go to places like the University of Florida to give talks. I remember a guy came from University of Illinois, he wasn't MIT, but the chairman of the department at Illinois, invited me to come and spend the summer at Urbana, which I did, with a view toward hiring me to join the faculty there. So in that sense, to answer your question, I was a unique quantity at Lockheed. In fact at the time, I was the only department manager, black, at Lockheed, anywhere in the Missiles and Space Company. In fact, they made a film which they would show to new hires, which I didn't realize—somebody told me about that. I remember making the film, but, they had me in the film because it's supposed to show that they had this big affirmative action program. [laughs] "Look, here, we've got this manager."

Wilmot: How did you feel about that?

Bragg: Well, I never saw it, well, it's not criminal, so what can you do? [laughs] But the fact is, I just happened to be a very rare quantity. It got me lots of exposure, people have heard of me that I had never heard of. I began to get calls or letters—yes?

Wilmot: Did Lockheed have a good affirmative action—to use your words, did it have a good track record, or did you think that—?

Bragg: It had an interesting affirmative action record. It had the first affirmative action program in the country. Literally, back in the early fifties, I guess, when Lockheed had a contract to build the C-5A, I think it was the C-5A, but anyway it was a big military plane. Not Lockheed Missiles, but Lockheed Corporation, the company of Lockheed in Georgia, Marietta, Georgia. And the local NAACP brought a lawsuit against the company because of discrimination in hiring and promotion. At that time there wasn't a single black employee there who had anything other than just at best a technician's job, no managers, no professionals. They couldn't even eat in the company cafeteria. This is in Georgia, right outside of Atlanta. Well, I think Kennedy was president at the time, Johnson was vice president. And the lawsuit got such—it brought a threat of cancellation of the contract because of these demonstrable cases of discrimination in hiring and in promotion and all of that. So rather than just bob their heads and say, "I'm sorry," Lockheed decided to make a big deal out of it, and set up an affirmative action program. And that's where it came from. Lockheed's president signed the contract with

Vice President Johnson setting up this affirmative action program. It dates back to Lockheed. Prior to that time in industry, there wasn't any.

Now, what that did was to improve things to some extent. People did get professional jobs, and lead jobs. They might have gotten managerial jobs, I don't remember meeting any there, not in materials certainly. But the people got more money, they got lead jobs and so on, there was some improvement. In the case [laughs] of the cafeteria, what they did first was to eliminate all of the seats in the cafeteria, because the crackers down there didn't want to—crackers, this is a euphemism for Southern whites—refused, they didn't want to sit down at the same table with black people. So Lockheed just took out all the chairs. Well, that solved that, so they put them back, they found they could stand it—they would rather sit than stand. But my point is that the affirmative action did—that's where it got its start. And it became a kind of an industry standard. Not just Lockheed, but large industries as well.

But back to your original question, I was unique. I'm not saying that proudly, I'm just saying it as a fact. And it had the effect of making me known to people who I didn't know about. Because you would go to a meeting and you were the only black one there, everybody recognizes you as black. But you don't recognize everybody there. Some of them, of course, you get to know from their papers, you get to know them personally, but people I didn't even know at all knew who I was. As I say, I began to get calls if I'm interested in coming to teach at say, the University of Pittsburgh for example, which I interviewed at. Also, I mentioned going to Illinois for a summer, which I did and didn't get an offer, and didn't want it either.

But even things like going to Argentina. This group of young guys that I had, one of them was Mario Pio Gomez, a brilliant guy who had got his Ph.D. at Stanford. I was his group leader and then I was his boss subsequently. Then he took off on some kind of a UN grant, we gave him permission to go, to go to Argentina and teach, which is his home country. Well, at that time the Argentine Atomic Energy Commission had a metallurgy division, which was essentially materials science. The manager of that division came to Stanford to spend a few months. While he was there I had a house party, and Mario asked could he bring him, Sabato, "Sure." So Sabato came, I met him, a great guy, he said, "Well, why don't you come and spend some time with us?" "Well, sure, why don't you invite me?" So in due time he did, invited me to come down and spend time working with a young guy who was just coming in from France with a Ph.D. in diffraction, but he is inexperienced, he's never run a lab, he's just done research. Whereas I run a lab for the industry and I have a better feeling for what you need and what you don't.

So my job was to go and consult for about, it turned out the money was good for about a couple of months. So they put some money in a Swiss bank for me, and in due time my wife and I went down to spend a couple of months, and stopped off at places like Lima, Sao Paulo, Brazil, Rio, and Buenos Aires, of course. Baraloche, a number of towns around. It was a great experience, I loved it.

Wilmot: What did you love about it?

Bragg: The novelty, for one thing. I had been to places like Japan, of course, and the Philippines and all that, but I had never been to Latin America, except for Mexico,

down in Ensenada. And certainly had not lived for more than a day or a few days. But now we were living in a commercial hotel in a very nice part of town, which meant they speak maybe a little English, but not much. So basically we're not in a touristy hotel. But I would go to the laboratory every day and work with people there, my colleague that I was there to mentor. And of course met the whole lab, because I'm the new guy, and everybody wants to practice their English with me. And I want to practice my Spanish with them. [chuckles]

That was good. Ran into a guy I had met in the army in World War II just before we went to the occupation of Japan. A guy named Jerome [Jerry] Poindexter. Jerry was the master sergeant at our battalion, had gone to NYU. When he got out he went back and took a degree in Spanish languages, and also in commerce or business, something like that, because he wanted to go to Latin America where there wasn't any racial prejudice, he thought. This had happened and I had kept track the first few years after we got out of the army. But then we just sort of faded away. Now it's 1966, or thereabouts, and so it's like twenty years later. Naturally, when I discover I'm going to Argentina, I look him up.

And it turns out that he hasn't found it to be quite what he expected. He's married, has a child, has one son. And he runs a language school to teach Argentines colloquial English, so that they're fluent in English. His feeling that he'll get into commerce there was not true, it's an old-boy society, and he's not one of the old boys. We hired him to tutor my wife and me in Spanish while we were there. That was interesting. But anyway, that two months spent with looking at the whole technical situation vis-à-vis materials science in the whole country.

But it doesn't take that long, you see. Argentina only had 25 million people in it, and probably 15 million of those are in Buenos Aires. So it's a whole lot of land, [laughs] but not much in it. There are only two centers of any significance that had technical content, three, I'm talking material science. The metallurgy division in Buenos Aires where I was, that was home base. There was a research institute in Baraloche, which was a resort town, a beautiful place, like Tahoe. Mountains and snow, underwater diving, and skiing. A beautiful lake with a research institute where the smartest graduates in physics went for their advanced training. And Cordoba, which was their Detroit, where they built mostly automobiles, but also they built airplanes there. That was essentially it where the concentrations of technical people were, and I got to know just about all of them. If I didn't know them, I at least met them. So that was an interesting experience that came out of being at Lockheed and getting known to people.

So it, as I've said, after a while as the sixties wore on, remaining active professionally, getting to know people, getting around, and getting asked to interview, or if I'm interesting in teaching, I realized that sooner or later somebody is going to make me an offer I couldn't refuse. And [laughs] Berkeley did. That came about because as I said, I was active professionally. I hired people as consultants, I served on committees with them, and I could hold up my end.

Wilmot: Before we get into Berkeley, can I ask you a couple of questions about Argentina?

Bragg: Speak, speak.

Wilmot: So you mentioned that Jerry Poindexter, he had these kind of utopian expectations of a life in Argentina for him as an African American man. Did you—

Bragg: Understand, he's not a very Negroid-looking African American either. He doesn't look like a Spaniard—he's a rather light-skinned African American, maybe a little lighter skin than me.

Wilmot: So did you have any similar expectations when you went there, or were you—?

Bragg: No, well, I didn't know what to expect except that Sabato was the boss of the metallurgy division. He was a very outgoing guy, I might add, Sicilian. Darker than me, incidentally. So color is not really that relevant in terms of stereotypes. But Sabato didn't have the slightest hesitation in asking me to come down there and spend their budget to come. Now, that might have been because Mario Pio, who was one of my guys in my department, who had been a Stanford Ph.D. candidate, was well-known to him. Mario was kind of a radical, had been more or less run out of Argentina at one time when they changed governments, or his father had, at any rate. His father was in the Argentine military someplace.

But anyway, the point is that Sabato was not ignorant of issues of racial discrimination. He was a man of the world. But it wasn't an issue that loomed large enough that he saw fit to even touch on it. About the only thing that happened that you might say speaks to that issue directly, was around the laboratory we would have lunch in the cafeteria and there would be a lot of by-play, and people would talk a lot, but there was one guy, I forget his name now, but he was very skinny, fair, but he had coal-black hair, and his nickname was Blackie. But they would never say his nickname, which would come out something sounding like Negro, they would never say his nickname in my presence. I found out later that they wouldn't do it because they were afraid [laughs] I might take offense. [laughter]

Wilmot: That's funny.

Bragg: I can't remember his name now, but anyway—. But if you were expecting to find stares and so on, I never saw any of that the whole time I was there, we were there, which was two months. I think I saw two people, I know I saw two people who I felt were recognizably of African in ancestry. One of them was a guy I just saw on the street, walking down the street with his clearly Argentine wife, was kind of a blonde woman. He had kinky hair and brown skin. No doubt about it, he was of African ancestry. The other guy was a very black guy in a musical revue we went to see one time, and the chorus, they had male dancers and female dancers, and one of them was this black guy. The point is, if there is a point, at that time, you would not have seen a chorus with black men dancing with white women in the U.S. But it was nothing there, it was just there.

Also, haircuts. I was concerned—I had kinky hair. What do I do when I need a haircut in Argentina? At that time I had hair, at least more than now. [laughs] And sooner or later you will need a haircut. And I worried about it, if not worried I was concerned. I finally asked one of the guys who was kind of swarthy, Funes, “What about a haircut, Funes?” He said, “Well, just go to my barber.” I said, “Well, yes, but now wait a minute, he's probably not used to cutting kinky hair.” He said, “No, not probably. We've got all

kinds of people here from Central America.” You see, right next door in Paraguay, Uruguay, Brazil, you've got black people up the ying-yang, of all gradations, from pure white to pure black. So kinky hair is not unknown in Argentina, or in Latin America. It's all over. Not only that, but my ex-wife who has, if not kinky hair, it was certainly not very straight, they didn't have any problem at the beauty parlor. Not an issue at all. We thought—here, because white people say that they can't cut black hair—it's not true, they just don't want to, or have just never been trained to, but down there it's not an issue at all.

So anyway, culturally that was one of the things that stood out. The food, I got so tired of eating steak every day. [laughter] Cheap, great steaks, and after a while I started eating spaghetti and stuff. I just got tired of steak. But it was so cheap that that was what you did. We would eat out every day. We never cooked, we lived in a hotel. We would have breakfast in the little bar downstairs, and then lunch somewhere, lunch out at the campus. But dinner we would eat out always, either at somebody's home or in the restaurants.

Wilmot: While you were at the lab, or while you were kind of engaged in your professional activities, what was your wife doing?

Bragg: At first the guys' wives stepped up and invited her out to take her around. So she got more of the tourist bit in that sense than I did. But if that were not the case, she would just go down to downtown and go to the shops and look around. Florida Street was the street that they—they would block it off after dinner hours so no autos would come, just like a promenade. Beautiful, you know, beautiful shops, upscale shops, that kind of stuff which was kind of nice. We were very near a park, too. There was a subway, but we didn't use that very much. But anyway, the answer to your question is, she got help from the fellows' wives and girlfriends, and they would have parties, house parties which were interesting.

Wilmot: Your children, while you were away for two months, where did you park them?

Bragg: With a friend, who had children. So she worried about that, I didn't. They were—this was now '66, one was born in '51, the other was born in '53. So they were old enough to make their own breakfast and stuff.

Wilmot: They were teenagers.

Bragg: Now, they first didn't want to go, and then second, we didn't want to leave them. And perhaps in hindsight we should have taken them, but we didn't. But that didn't create a real problem.

Wilmot: I have a question that I just want to ask you before we go too far away, you mentioned the affirmative action program at Lockheed, was there pressure for you to be very active in recruiting other minorities too?

Bragg: No.

Wilmot: Did people kind of assume you would be involved and steer people your way?

Bragg: No, that never came up. Recruitment, yes. But not ethnic recruiting. That's a good question because I did recruiting. When I was in Argentina I recruited a guy who eventually became my boss—I'm sorry, my successor. Aldo Vidoz. He was the boss of the metallurgy group at Baraloche in the research institute where I went. Juan Carlos de Baraloche, that's the name of the place. He was the smartest guy I met, if not the smartest, the most effective guy I met while I was down there. When I came back I told my boss, Ed Burke, "We've got to hire this guy." So we did. But when the time came to recruit—and you're always recruiting even though you don't have a job, because people come and go—what we discovered was that the personnel office is not good at hiring special people. It's good at hiring ordinary people. We never had much luck hiring people for the laboratory through the personnel office. That usually was done by technical people accompanied by a personnel guy who knew all the rules and the benefits and all that. But to discuss the nature of the work that you're doing, you have to kind of understand what you are doing. And the personnel people were sort of superficial on that. Nothing to say that's derogatory, but just a fact.

It kind of pissed me off in a way. Because they'd already had a break and didn't have to go, and guys who didn't go to college had to go, and I couldn't see why you should be all that precious. On the other hand, a lot of money's been invested in training the person. But some kind of military service ought to have been required, and ought to be required now, for that matter. So once a year—no, I didn't do it every year, but several times, I went out on recruiting trips, to major school like to Cornell, or to wherever. And different people would go to different schools so that it wasn't burden on any one person to become a salesperson. But I remember going on recruiting trips where we'd interview these guys and the first thing they'd want to know is would they be declared ineligible for the draft. It must have been that Vietnam was on and they were afraid that once they finished school they would have to go to Vietnam. [chuckles] So if you were part of an essential defense industry, that would get you a deferment.

But anyway, I did go on interview trips. And I guess the people that I would be interviewing, by and large, are guys who are looking for a job. They don't see me as someone beneath them at that moment. I represent someone above them, hopefully who would get them a job. So I never got any flack from that kind of thing.

One time, I went back to my old school to give a talk, mainly though to put the word out that we're looking for people. That's a common device. You go back and visit your old department, especially if you don't go back during the regular recruiting period but at some intermediate time, and in the act of going afterwards through your talk, you let it be known that you are always on the lookout for talented people. I remember this particular time giving a talk, and going out to my car in the parking lot, and a guy that I knew who had been in the audience, a black guy, who said he wanted to know more. For some reason, he didn't feel like overtly raising the issue in the presence of everybody else. I was giving the talk in the metallurgy department of the campus. But he was in the metallurgy department of the foundation, which is another beast but on the same general campus. Had got his Ph.D. in the metallurgy department of the campus. He's gone all over. He's gone out to Tennessee State and he's come back. Name is Frank Crossley, a friend, a dear friend. Frank wanted to know more. I said, "Yeah, we're looking, would you like to come out and talk to us?" "Yeah, sure, why not?" So one thing led to another. Bam! Hired him! One of the best hires we ever had.

So I managed to hire my successor Vidoz. Frank Crossley was the second black professional in our material science laboratory at the Lockheed Missiles and Space Company.

Now, there was one other black guy over in electronics, when I got to Lockheed. That's Warren Henry, who passed at the age of ninety-five or so. But other than that, we didn't have any other blacks on the hill, where the lab was situated in Palo Alto up behind Hewlett-Packard.

Wilmot: You've mentioned Warren Henry before.

Bragg: Yes, Warren was probably one of our best scientists, historically, whether physics or what. Interesting history, born in Alabama, parents had been college graduates, teachers. Went to Tuskegee [Institute], got a bachelor's degree, in fact, he got three: physics, mathematics, and French, something like that. And he taught a while, and then he went back to Atlanta, Atlanta University, got a master's degree in chemistry, and eventually went on to go to graduate school at the University of Chicago. And during World War II, he went back to Tuskegee, teaching physics to cadets who were going to be in the 99th pursuit squadron which became the Tuskegee Airmen. Got a job after that for a while in the Radiation Project at MIT, from there to the Naval Research Laboratory for a number of years where he did his most outstanding work. And then he came to Lockheed—he was there when I got there—and stayed for about the same period of time that I did. Then, he went to the Howard [University] physics department, and eventually retired. But became a fellow of the American Physical Society, I think, member of the National Academy—I'm not sure about that, but certainly a fellow.

I might have mentioned that what he's best known for is the magnetic properties of materials, especially elements, the 5D transition metals. And he verified the Langevin Theory, I think it was, of magnetism of these materials at low temperatures, and the research that he did that did that, there's some data, a graph of his results, that is so beautiful, from a scientific point of view, that you will find it in every textbook on solid state physics or general physics, throughout essentially the whole world. It's work attributed to W.E. Henry but it doesn't say Black!

Wilmot: Since you were both working at Lockheed, was there ever any interaction?

Bragg: Yes, when I first came to interview in January of 1961, Warren was already there. He had been there for a few months, I guess. He was across the hall. I was in materials and he was over in electronics. So we were the black presence there. [chuckles] And I knew who he was and I had seen him at meetings, mind you, even before I went there. But we never said anything other than just hello. He was not a very gregarious guy. Very pleasant, but not terribly gregarious. But for this purpose, my immediate boss, Ed Burke, who wanted to make sure that I was reassured on the racial issues, arranged for me to talk privately with Warren Henry. And Warren's job was to reassure me, "Don't worry about housing, and all the race bit, this is the Promised Land." And he pointed at what his department had done in paving the way for him, finding housing, what they had done for him in the way of promising him a magnet, which he never got, incidentally, a high field magnet.

Wilmot: Promising a magnet?

Bragg: Well, his work was in magnetism, and for that you need the magnet to produce high magnetic fields. And they're not cheap. But Lockheed now is in this affirmative action mode. And also status-building. They want to out-Bell the Bell Labs in terms of quality of people. So it's not just getting people, but people who have instant name recognition and things like that. So Warren of course would have all that. And to persuade him that this is a place to come. "Well, Lockheed is not working in magnetic—" "Well, we'll get you the magnet that you need." On that promise, that helped his decision to go there. But as I was saying, they never did produce the magnet. He got around that, of course, but that was a disappointment for him. How'd he get around it? [chuckles]

Wilmot: Perhaps, if you know.

Bragg: Well, he came over to Berkeley and used the Giauque magnet! Giauque was a famous chemist who had been part of the Berkeley faculty who was interested in magnetism. And they had a magnet that produced very high magnetic fields at low temperatures. So Warren approached [Glenn] Seaborg, who was then the Chancellor, I guess, about the use of the magnet. He said, yeah, if he could use it at night, fine. So Warren would finish his work at Lockheed, load his equipment in his station wagon, drive over to Berkeley, set it up at Berkeley, work all night, take it down, go back to Lockheed and work.

Wilmot: So was that a reassuring conversation?

Bragg: I didn't know all that then! But in terms of his reassurances, it told me, yeah, I don't have to worry about housing discrimination, they promised him the moon, the pay, I knew what that was going to be, that was good, the people around me. He reassured me on the racial issues. The rest of it was already reassuring. The reception that I got, it was clear that it wasn't going to be no "Don't call us, we'll call you." It was going to be an offer and it was going to be, "We really want you." And they did. It panned out.

Wilmot: Throughout your time there together, did you and Warren Henry communicate?

Bragg: We were across the hall. At times I'd work late; he'd work late. I was, you know, a workaholic. We would sometimes rap a bit, just generally. We were not boons. That's a slang that you won't appreciate. [laughter] You have to be an ethnic to appreciate that one! But we were certainly friends. And he didn't share confidences with me. But we were very cordial and very congenial. He was active, he would come to NAACP meetings, for example, he would interact with the black community in that way. But he was a very secretive man, he was married to a white woman. But he just wasn't a very social type, anyway. And also we worked a lot.

Interesting thing about that is, one NAACP meeting we had—we had these various inspirational speakers come out—and one of them was Nat Colley who was then on the national board of the NAACP and a very successful lawyer in Sacramento. He was so successful, he had racing horses! [chuckles] If clients couldn't pay their bills, they'd pay it off in horses! But anyway, Nat was giving this talk, whatever it was about. And all of a sudden he stopped and said, "People, I'm going to have to stop here and say that I recognize this man here in the audience and you ought to know who he is, because if it

hadn't been for him, I wouldn't have made it into the Tuskegee Airmen." He recognized Warren Henry. So Warren, he was that kind of a guy.

Well, all told then, we were talking about interactions with people. I had mentioned that I was beginning to get these requests to "Come and speak, come and do something, would you like to come and teach?" And one time I happened to mention this to one of my colleagues at a local society meeting, AIME I think it was. Victor Zackay. Vic was on the faculty at Berkeley, rather well accomplished guy. We were forming a local chapter of AIME, and so we brought in people who might be important for that. And being an outstanding metallurgist and active already, he wound up as the leader in setting up this local chapter. And of course I joined the chapter, naturally. And one day we were talking and I mentioned that I had either gone out to Pittsburgh to interview and it was too dingy, kind of a depressing atmosphere, and he said, "Are you interested in teaching?" I said, "Gee, I don't know." One thing led to another, and Vic then goes back to Berkeley and talks to people who might have something to say about it, including his close collaborator, Earl Parker, and the department chairman, who was Jack Washburn, about this black guy at Lockheed who is "perfect for us because he does x-ray diffraction which we don't have anything really good in, and he's black."

Now, the guys who were in metallurgy already knew me. But other people were involved in the decision besides metallurgists when it comes to this kind of hiring action. But at any rate, it was set up. The way the procedure is, you come over, you give a talk. And the reason for that is people want to hear what you have to say, see what you look like, the quality of your work, how you defend what you say. In addition, you go to lunch with a bunch. There again, they see your manners, your deportment in that kind of social situation, and there may even be a dinner. But the important people who are going to be making a decision about whether or not you are going to be offered a job are going to be certainly there to hear your talk.

You stop off at the department office and talk to the department secretary and that takes care of your department expenses, your honorarium and all that. And a few facts about your biography. You already got a resume which they ask you to send.

So in due time, I get a letter from the chancellor saying, "We'd like to have you come and join the faculty at Berkeley at such-and-such a salary, such-and-such a rank, and if you'd like to do that, sign here." Just as simple as that. No going around to the personnel office, sitting there being interviewed by a guy that maybe isn't all that disposed to hire you anyway. None of that. But of course, the scut work has taken twenty years to do that so it's not like you walk in with nothing to offer.

And it turned out that the x-ray diffraction laboratory they had was totally obsolete. And the guy they had doing it was totally inadequate for teaching anything but the very barest bones. I certainly would bring a level of sophistication that they needed.

And one of the faculty members (Gareth Thomas) not only was a guy I knew, I had hired him as a consultant to teach an in-house course while I was at Lockheed. So there was a lot going there that made it easy for them to see me as a viable candidate for a job. So, I was hired there.

Wilmot: I want to back up a bit because I want to talk about Berkeley next time. In our remaining time together today I have a few questions. The first one is, just now you said that you think that service in the military should be mandatory for everybody?

Bragg: Yeah! Absolutely!

Wilmot: That was kind of a surprise to me to hear, because it sounded as if you had been very glad to leave the military. Can you tell me a little bit more about that?

Bragg: Yeah, it's very simple. When the time comes to defend the country, I think everybody should defend the country. It's our country. Nobody should be exempt. I didn't say you have to go out and get shot, but some kind of service. And this is so common in Europe that you wouldn't even debate it. As far as I'm aware, this is the only country where this is not true! Some kind of mandatory military service should be required certainly for every male. It may take different forms. For example, when I was in Argentina, I met a young electron microscopist there, he was doing his military service. They had sent him over from France to set up an electron microscope lab in Argentina. That was his military service. But he was doing some kind of service! And so I'm saying I don't see where one guy should be exempt because he happened to be in a, quote, "profession that's needed." He's that young, he's not all that needed. He's just starting; he's not up at the top. Besides, he can teach, any number of things he can do of service. But not to have to serve your country and still enjoy the benefits of being the country is just wrong. So I hope that answers your question.

Wilmot: Yes, I thought I was hearing two different things, thank you.

Bragg: No, no, no, no. And for some it turns out to be a good career besides. But I'm not advocating a career, I'm just saying service. Bush, for example, should have been in the army, and Vice President Cheney should have been in the army. So should Clinton. Every one of them should have been in the army. Or navy or air force, whatever service.

Wilmot: I'm switching gears quite dramatically now. You mentioned that while in Chicago your wife was working. Did she have a job while you were at Lockheed Martin?

Bragg: Oh yes. Shortly after we arrived in California, by virtue of having an ingress via Andy White (who became our first family physician), we met the black bourgeoisie in the Palo Alto area. They weren't that numerous. They were spread around. So it wasn't the pattern of residential segregation that we were familiar with back in Chicago where everybody lived in black enclaves. In that area, that just didn't happen, except in East Palo Alto, but we weren't living there, we were living in Palo Alto. But Palo Alto, Sunnyvale, Mountain View, basically they were so few in numbers that after a while you got to know everybody. But we got to know them quickly because of Andrew White getting us introduced around. So very quickly, she got involved in Jack and Jill. Which is a group formed to provide peer group acquaintances amongst middle-class black children, where the closest black may be miles away. So normally, you would never encounter them. But to add that cultural dimension to their lifestyle, that's what Jack and Jill was for, and still is. So we got into that, and picnics, and—.

So anyway, very soon, we were going to a picnic somewhere and still being introduced, and she mentioned what she had done before coming to California, and it turned out

somebody there was from the county welfare department, Santa Clara County, right there in Palo Alto. "Well, we're looking for people." So without even looking for a job or hardly landing, a job came looking for her! So she worked there until two or three years ago.

Wilmot: What did she do there?

Bragg: Social work.

Wilmot: Two or three years ago?

Bragg: Well, maybe four or five years ago, because she's almost as old as I am, and they wouldn't let her work until eighty. But the point is that, except for a short period while we were separated, when she didn't work, she worked there from about '61, '62 until four or five years ago, whenever she retired. And she worked in the children's division in Chicago. She was the intake supervisor for years at the Santa Clara County Welfare Department. So the answer is yes, she not only worked, she worked almost continuously.

Wilmot: And when you mention the black bourgeoisie, who was that in the peninsula during that time?

Bragg: That essentially was all the people who were professionals—he or she. That would mean schoolteachers, social workers, people who were engineers or accountants, generally that kind of white-collar job. There weren't that many scientists. There were one or two other guys. One guy worked at SRI [Stanford Research Institute] who was a chemist. But basically, we were all professionals of one kind or another. Names I wouldn't remember off hand right now, but there weren't that many.

Wilmot: Did you feel like Jack and Jill was an important experience for your children?

Bragg: It should have been. But how well it took is another matter. The tendency, if your neighborhood is well integrated, is to form friendships that have to do with your immediate environment. And the Jack and Jill environment is kind of a contrived one that doesn't happen every day. My son's friends, for example, and my daughter's for that matter, were kids from around the neighborhood where we lived. They knew the other children, of course, but you don't see them every day, you see them once a week or something like that for a few hours. So the Jack and Jill idea is good, I think. But how it works out in practice maybe is by individual cases. It didn't achieve—how to put this—my son had more white friends than black, and to some extent that was true of my daughter as well. So I think it's a good idea, but I think it only goes so far.

Wilmot: I would like to close for today.

Bragg: Do.

Interview 10: July 21, 2002

Wilmot: Today is July 21, and we're here with Professor Robert H. Bragg, and it's interview number ten. Was there anything you wanted to add to the last session or anything that you thought of that needed to be added?

Bragg: Just in case I hadn't mentioned it, I think I did, but one of the things I'm proudest of when I was at Lockheed was hiring Frank Crossley who was a metallurgist, much more skillful in materials science than I am, for example. So he had quite a good career at Lockheed. I think I explained how that happened, but I want to make sure I got that in there.

His wife, Elaine, was quite a good painter, artist. She always thanked me for rescuing Frank from IIT Research Institute where he had been employed in metallurgy. I was over in materials science (which included metallurgy at Lockheed), and he was in metallurgy and had kind of gotten stuck there at IIT, so coming to California was a big, an important move for them. And she gave me a lot more credit than I had coming. He was deserving of everything he got then, and more than what he got. He invented some important alloys, for example. That's maybe beside the point here, but anyway, I'm very proud of that. The impact I had on the small group that I had I think was good. They were all white, of course, but nevertheless, I liked them. They were my children in a way. They all did well, they all wound up with Ph.D.s, and fairly successful careers, so that was good.

Wilmot: It's always amazing to me when scientists and mathematicians refer to "their children."

Bragg: Well, it's like that, because you see them develop, you participate in their development, if they do develop. Not everybody takes to that, but those that do, you just enjoy seeing them develop and do things and do well. I get a kick out of it any time I hear one of my former students, my old graduate students or students with BESSA, for example, doing well, I just get a big kick out of that, it's just good. Or even people that you see who they've gotten stalled somewhere, and you say, "Look, why don't you go back to school and get your Ph.D." They do that and come back and tell you, "You know, you really did get me off my rear and to moving." That's good.

Anyway, I wanted to mention that. So why don't we press on. [laughs]

Wilmot: Okay. I appreciate that you were thinking in terms of the thing that you were proudest of from Lockheed.

Bragg: Well, of course the other thing was that it was easy to hire Frank once I had gotten there and made my bones, you see? So my impact may have extended beyond what I personally could recognize. I did mention that I was told by people who had been hired in Lockheed after I got there that they saw an orientation film with me in it. And the only reason for doing that was to tell people that, "Yes, we do have some black people who are doing professional things." So [laughs] maybe that's kind of a left-handed way of saying, "That's good." But it did have some significance, I guess.

Wilmot: How successful did you feel that you were when you were at Lockheed in recruiting other minorities, or was that a focus for you?

Bragg: Not really. I wasn't on a white horse. I saw myself as—I didn't look at myself that much, but I felt that what I was trying to do was to do the best damn job I could in whatever situation I found myself in. First of all, I didn't want to be a manager, and certainly not a director or a vice president or whatever. Those things, my experience with the administration, going back to my days in the army when I had to deal with all kinds of people and personalities, I did it well, but I didn't like it. I more or less shunned the limelight in that sense. So I didn't see myself as going out to beat the drums for recruiting black people. On the other hand, the experience with Frank, for example, if I was ever confronted with that kind of possibility, naturally I would jump for it. So it helped everybody. It helped the company, it helped him, I felt better, so—. But I wasn't on a soapbox.

Wilmot: I understand. You also told me that when you were at Lockheed you were a workaholic.

Bragg: Yes.

Wilmot: What did that mean, in terms of hours and commitment?

Bragg: Well, it meant that there was no such thing as a forty-hour week. That's what we got paid for. But anybody who—any successful anything, not just science, or—even politicians, who may seem to do nothing—. But to be successful in a competitive environment means an enormous input of effort. So I got more work done, and had to, for example, before the regular workday began by getting in and coming in early, or very often, staying late and working weekends. So in that sense it's not that I never went to see a movie or anything, but I did tend to spend, oh, a good sixty-hour work week, things that I could attribute to work. That would be an unusual case where I didn't put in that much time, work-related effort. That would be very unusual. And many times, more.

But in the sense of people who managed to be fairly successful, that would be more or less standard. But the person who punches the clock at eight o'clock and goes home at five o'clock and goes out to the bowling alley and can't wait to get to the bowling alley, he would consider me an alcoholic—or rather, workaholic. Well, I was an alcoholic too for a while. [laughs]

Wilmot: Okay. Sometimes being a workaholic will do that to you.

Bragg: Yes. One of the tenets of a good alcoholics program is, "Don't get too tired, too lonely, and too," something else, I forget what. "And don't feel like you've got to be all things to all people, or solve everybody's problems." These are things you have to avoid, otherwise you could wind up with an abuse problem.

[interview interruption]

Wilmot: Yes. You've described for me the process of how you were kind of brought to Berkeley. Did you go through an interview process?

Bragg: Only indirectly. You see, I was in a sense a known quantity before I got there. So I didn't have to, in a formal sense, go and do what we normally did in hiring faculty, that I saw later when I came there and participated in exercises in recruiting people. In my case, as I mentioned, I knew a couple of key people, senior people in the faculty. One was Victor Zackay, who was a metallurgist, had been in industry and so we could talk that. I had been on committees with him, and in general, we had a good relationship. Another one, Joseph Pask, who was a ceramist, and not a metallurgist, also knew me because I had worked with him in setting up an International Conference on Ceramics, something like that. Which incidentally, I didn't attend because [laughs] I was in Argentina at the time. But there was a famous electron microscopist on the faculty, why I can't bring his name I don't know, [Gareth Thomas] because at one time I had hired him as a consultant at Lockheed, to give an in-house—. So I knew, there were key people who were strong in the faculty who knew me.

The area where I was best known, x-ray diffraction, was the area where they were weakest, had nobody on the faculty who was really skilled in that field, so I filled a need.

Plus, there are wolves out there howling at the gate. I didn't know that, but the whole campus is under siege in a sense, to hire minority faculty. So they probably had been more or less exhorted to, "If you can find a minority person that you feel safe in hiring, we give you permission to go ahead and hire them." So I didn't know that, but I know it now, that that must have been the situation, because over time people who weren't even in my department who had passed on my application—I didn't even know them—let me know tangentially many years later that, "Yes, that was—you were a good—it was an easy decision to make." But at any rate, the point is that I wasn't aware of all that. I knew about the students raising hell at Berkeley because that got Reagan elected. [laughs] So that wasn't news.

So when I came, the interview in my case just consisted of bringing me over to give a talk, which is open to the campus community, the technical community, of course. But what happens in that situation is the key people who are going to have to make the recommendation are sure to be there. And not only from the department, but at that time hiring into that department meant that you already became a part of the materials science division in the Lawrence Berkeley Laboratory, so you were really interviewing for two hats, which meant two jobs, meant two salaries. One a summer salary, but equally important was a budget. So you came already with money. Once you were in, you joined the faculty, your regular faculty money, your regular job, your summer money, and money for graduate students. And equipment, money for equipment. So you came in ready to go. Of course, you had to set facilities up, but basically a lot of the stuff that goes into hiring into many research universities—a young person, for example, coming in might be promised a certain amount of money for equipment. If they want him bad enough they would promise that. But he would then have to jump in and start writing grants, writing money for grants and whatnot to get money to operate with. I didn't have to go through any of that, it was already set up for me.

So the guy in the Lawrence Berkeley Lab, Leo Brewer—I might add that the same guys who were my front men, you might say, [laughs] on the faculty, were already part of the lab on the hill too, in addition to the director who stood above them, that was Leo Brewer. So all those guys are there when I'm giving this talk. So everybody's there, can

see the same person. Then you usually have a luncheon, and the point of the luncheon is that other people who want to come and just rap, about anything, can see how you respond, I guess if you hold the right fork, or whatever. So you've got a lot of people who can be queried about, "What do you think about this guy?" Well, they'll discuss, "Well, when he gave his talk, he didn't respond too well to that question. He's not all that strong." Very often that would happen when a candidate would come up. He couldn't function on his feet, or he'd get caught out there with some obvious thing he couldn't answer, that would be the kiss of death. But I obviously went through all that successfully. But all I knew at the time was that I came over, and I gave a talk. Then we went by the department office and the department administrative assistant asked me a few questions, which I'm sure was filling out my application for me. I might have signed it, I don't even remember! But that was it.

I remember one discussion with the chairman, Jack Washburn at that time, who—God, I'm trying to remember the other guy who was the electron microscopist that I had, as I said, hired earlier. We discussed in what way we might compliment each other, because many of the things we could do were complimentary. We discussed that and showed how, that you know, this would make sense, it would have synergistic qualities, you might say. So I just went off, and I was told, "Look, it will take a few weeks," but more or less told me I was in. So when I went back to—I'm not sure what the chronology was, but it was clear that Zackay—Gareth Thomas was the other guy, the electron microscopist, G-A-R-E-T-H, Thomas, Gareth Thomas, a Welshman. From talking with Zackay, between he and Earl Parker, who was sort of a powerhouse in the background, and Jack, I knew I was in. I just knew it was going to happen.

Now, this was like in the spring, early spring of '69, because by June the 30th, I had the appointment. Now, normally, at that time we still had the quarter system, and to get me going, they right away asked me to give a course, a summer course, which they normally didn't do. So I elected to give a course on something that nobody there had given, or could have given a course on, on small-angle scattering, which I was getting to be pretty good at. So I started off, I hit the campus teaching. Actually, I was commuting from Palo Alto to Berkeley, I hadn't even moved over yet, finding a place to stay and all of that.

And not only that, but [laughs] the situation being as chaotic, in as much turmoil as it was, and without realizing what was happening, I was asked if I would serve on this Committee on Student Conduct, which is a faculty committee, faculty-student committee having to do with students who run afoul of the rules of the university. That was a busy time for this committee because there had been a lot of sit-ins, and people invading the classrooms, and doing all kinds of stuff like that that were prohibited. So the question is, what do you do to punish them? You don't just expel them, necessarily, that would be very rare. But different kinds of punishment would be meted out, depending upon whether or not—what they had done—convicted of doing. And so there were two ways it could go if it's a campus-related offense, and doesn't involve the police or authorities outside the campus. Then, the arrests and so forth are done by the campus police. There's even a small lock-up area in the basement of one of the halls there where the campus police force has its offices.

But basically the students would be given an arrest form and whatnot. And in due time they could have a hearing. It could either be the Committee on Student Conduct, which

tended to be rather lenient in what it did in terms of punishment, or it could be an open hearing like a court, where it would be faculty from the law school that sat in judgment on the case. Now, it turned out that the Student Conduct Committee tended to be so much more liberal—the activist students very quickly realized that it was much better to—you could choose whichever way you wanted to be heard. It was much better to be heard by this committee, because it tended to have faculty who very often weren't that far removed from the attitudes of the students. Not all, but tended to be pretty liberal in terms of what the students seemed to be trying to do.

But I'll tell you, it was quite an experience. I became aware very soon of what literally had been happening on campus, I paid no attention to before. I heard lots of cases of, mostly students who have gotten carried away with—I'm not sure the word revolutionary zeal is right, but not bad kids. Quite often from small towns, who had been valedictorians somewhere. Of course, everybody there is a valedictorian somewhere. And they had justifiable grievances against the university, which up to that time had treated them much like numbers. Not people with names and faces, but numbers. And so that, in other words, if the university hadn't been so slow to make adjustments, they probably would have escaped a lot of the turmoil that had went on. And of course, if you sit back and think about it and you're not too much—you don't have too much invested in the old way, then of course you can see the students' point, see that you don't need to kill them just because they protested against something which didn't make any sense, or made very little sense. So quite often the students got away with murder.

Wilmot: When they came to your committee?

Bragg: I mean, had they been in Reagan's court, [laughs] that would have been the end.

Our committee, I would say, was very generous in the way it treated them.

Wilmot: Do you remember who served on that committee with you?

Bragg: I don't. I don't even remember any of the names or even the guy from the university, the staff person whose job it was to liaison with the police and all that. I imagine if you called their names I'd know, but—.

Wilmot: That was actually right in 1969?

Bragg: '69, '70. I got off as quick as I could, but your appointment usually was two or three years, something like that. I do remember that sometimes—see, students could represent themselves. But all too often, not all too often, but usually they got law school students who were seniors, and they were practicing their bones, they were getting their bones doing law. And it was kind of funny to see them come on with the mannerisms very much like the stuff you'd see [laughs] in the movies. “That goes to the heart of the issue,” and so on. [laughs] One of the law students was a Haste. I think his uncle or father or something had been a judge of the Virgin Islands way back. But anyway, it was kind of funny. Some of the occasions were so funny, you almost had to laugh at the extremes that lawyers will go to prove that black is white. [laughs]

In once case—I don't know whether you need to record this but it is so funny—there was a movie. Understand, this guy, he has been arrested for kicking a police officer who is on the ground. The students had come through a windows in one of the classrooms, spilled over into the classroom, disrupted the classroom, and when the police tried to arrest them, one of them gets knocked down and this guy kicks him. Well, in explaining this away, the lawyer, the student lawyer says, “No, what he is trying to do is make sure he doesn't kick him.” In other words, he realizes it's a policeman, and he holds his foot up. [laughs] Well, I don't think that was true at all. But the way the picture was presented, you couldn't really say whether the foot was going down or up. So we let him off. [laughs] I don't know exactly what the punishment was.

Wilmot: It sounds like he went to great lengths to make a film and bring it in.

Bragg: Oh, no, he didn't make a film. The policemen had people photographing things. There must have been some question, some way you could, by making a long stretch, you could stretch it to say, “Well, the foot wasn't going down, it was coming up,” or something like that.

Wilmot: Yes. You would think that the police would have brought charges, and that would be something that would be tried in a traditional—

Bragg: Well, the police are the campus police. The university doesn't want all that publicity, plus or minus. You understand that the student protests basically had their origin in the fact that the authoritarian approaches that were common beforehand. They just took issue with it, had gotten to the point where they just didn't see any sense in a lot of this strict authoritarian approach that the university—. It wasn't just Berkeley. Berkeley just happened to be out in front. So the university wants to keep a lid on it. It's bad enough that the reporters would be there photographing these demonstrations with Mario Savio out there preaching from I forget which hall it is, saying, you know, “Take back the classroom,” and all that. Well, most of these kids weren't that revolutionary, but would just be there in the crowd, just happened to get stuck out there where the big crowd was. But anyway, the university doesn't want to air its linen. So to the extent that it can be contained, and not let people get off scot-free when it's obvious that you can't do that because that just invites more anarchy. So somewhere in between is where you want to strike a balance. And so I think that they probably succeeded fairly well.

Anyway, it was a pain in the ass because you met several times a week, at first, there were so many cases. One thing I didn't like was the students who were on the committee inside were sort of like Trojan horses in that they would go outside and deal with and counsel the protestors. In other words, they were really not being as impartial as I thought they should have been. Not every student did it, I don't think, but enough of that happened that it was clear that a lot of that went on. So the students weren't pure, they weren't pure.

Wilmot: You mentioned that you got off of the committee as quickly as you could.

Bragg: Yes, the appointment is usually over some specified term, a year or something like that.

Wilmot: Why, was it because it was such a time drain?

- Bragg: It was a time drain, it made no contribution to what I was there for at all. It was a digression, it was a distraction. And my friend didn't do me a favor. In a way he did the university—I'm talking about Victor Zackay, who is the guy that [laughs] proposed that I join this committee. Of course they were glad to have me, naturally, because I was the only black on the committee, and a lot of students were students who were fighting for the Third World issues. So naturally it's nice to have a black person on that committee, especially if he's a full professor. So that was fine from that point of view, but it wasn't fine for me, really, because that distracted me from really getting on to what I was there for, and that was to contribute to the department's academic programs. None of that had a damn thing to do with materials science. We would get no bonus brownie points whatsoever for that.
- Wilmot: Did you find that that happened, that there were other areas in your university life where that happened, where suddenly you were pulled into areas of work that were not totally related to your discipline, primarily because you were African American?
- Bragg: Well, in a sense. You see, this is a pretty far reach, it's quite a far reach, but faculty, and I don't know about staff, but faculty tend to be—not tend to be, are evaluated according to three, and maybe you could stretch that to four criteria: teaching, research, university service and service to the larger community. And if you take the last two you can say, “Well, in a way the university contributes to the community, so if you just say service, that would cover both.” But by and large when it came to things that counted, that is either getting tenure or getting periodic grade increases, or changing from one level to the other, like going from assistant to full professor, or assistant to associate, associate to full and so on, or full to extra salary, above grade—the thing that stood out way above everything else was research. And so exemplary teaching never got as much reward as a large flood of publications. So in that sense, if you're out there dealing with behavior problems, your colleagues don't see that that's any of your damn business. Well, that's up to you, but that won't explain why you didn't have any more papers than you did.
- Wilmot: Yes. I want to just go back to the Student Conduct Committee for a minute.
- Bragg: Okay.
- Wilmot: I'm wondering, were there other cases that you remember as being very memorable or remarkable that stay with you now?
- Bragg: Not really. One kind of funny, I remember. It involved an apprentice in the bookstore. I think it was the bookstore. But at any rate, this case involved a black student, who was kind of like a thug. Or at least at that time he acted [laughs] like a thug. And was confronted with an accuser, not from the committee, but the police had found a white student who had witnessed this fracas, whatever it was, and pointed him out. [laughs] So when the case was brought up, this black student in confronting his accuser says, “Well, you don't know whether it was me or not. All black people look alike to you.” [laughs] The guy said, “No, it wasn't, it was you, buddy!” [laughs] It probably was, but my point is, see, the black kid used this broad idea that all black people look alike to white people. Which in some sense, you know, it's pretty thin, pretty thin. Not all of them look alike.

But basically, they were just cases where people were told to disperse and didn't, or they invaded the classroom, and they were told not to do that, so they were trespassing. There weren't any shootings or cuttings or murders and things like that.

Wilmot: It seems to me like it was a pretty intense introduction to the political environment of the university for yourself.

Bragg: Well, it told me a lot about the attitudes, what students were fighting about and also the general level of sophistication of the students. The one thing that stood out was that they weren't all humble. Everybody believed that he was the cock of the walk, practically. You found very few who were hesitant about asserting themselves. I guess that's because most students who you'll find at Berkeley had been somewhere near the top of their graduating class, if not the valedictorian, they were a dime a dozen. So they're used to being kind of kowtowed to, and thought to be something special. And so there is none of that hesitancy that you might find in students who are not at all certain where they stand.

Wilmot: As far as their political strategies, did you find those to be sophisticated?

Bragg: No, I couldn't say, because I didn't really get involved that much. The issues usually were issues around freedom of some kind, and students were out to say, "Well, that's infringement on my rights," and the university is trying to say that, "Well, no, we control that." And grudgingly giving and taking and giving until some kind of a steady state is reached.

And also when they no longer have to go to Vietnam, [laughs] some of this is—my respect would be a little higher for some of the students if I didn't think that their attitudes towards Vietnam—well, let me put it this way. My feeling about Vietnam was it was wrong for us to be there. But to run off to Canada and say it's wrong is one thing. To stay here and say, "It's wrong, and I'm willing to go to jail, or be a conscientious objector," that would be what I would prefer to see. But to say, "I'm going to run off to Canada and let some poor stupid guy who can't do better go," that I thought was kind of elitist. It's cynical, and I saw too much of that. That probably marks me as an older generation, but that's the way I felt. If you disagree with it, fine, but don't run off and let it drop on somebody else. For the same reason I felt everybody ought to have universal military service, as I told you, for the same reasons. If they're saving your ass, then why is yours so much more precious than mine?

Wilmot: What about universal teaching service, what do you think of that?

Bragg: I'm not sure everybody should be teaching. I'd have to think some more about what that implies, but I don't have a problem with people going to graduate school, for example, and being compelled to—if they have the—because not everybody can teach. And they may do more harm than good. But giving some kind of service, that I would certainly always agree to. You know, you can wave a flag and all that and say, "I'm an American." But if you're an American primed—that is with an asterisk—that means that some things that apply to other people don't apply to you, that I don't like.

One of the things about World War II that one could say, almost, probably obtained, pretty much, was that the rich and the poor went. Not always, but mostly. Even people

like Kennedy or Bush, Sr. went out and took a chance of getting their ass shot off. And I thought, "Now that, I can respect that." But a guy who joined the National Guard to make sure he stays at home, I have a problem with that.

Wilmot: So I was thinking about what that must have meant for you to be a new faculty person at Berkeley and then just kind of be thrust into the—

Bragg: It meant a whole new world.

Wilmot: —Almost into a hot spot.

Bragg: Now, that—our department didn't create the hot spot. My lead man, the guy running the ball for me was the guy who set everything in motion, [laughs] but he's also the guy who got me on that committee. [laughs] So I don't think he meant to harm me, but he said, "Well, maybe you can do some good here," being black and all that. But as far as the department is concerned, that doesn't mean a thing to them. What they want to do is to get this new guy in and add another useful dimension to what the department is doing.

So this means what I've got to do is to learn the culture. I've got to set in motion research programs to define where I'm going, the contribution I'm going to make to the department. And also, I've got to recruit students, recruit technicians to go with my efforts. I've got to develop coursework. Exactly where my teaching load is going to be, it's not too clear. But I will have to write sets of notes. And for a good three years I was constantly writing sets of notes for courses that—typically you have to teach a course about three years before you get to a point where you just fine-tune it.

The first year is just hell, the next year is better, but you realize that the first one wasn't all that good. And by the time you do it three times, the next time you can pretty well go back to this—my notebooks would be that thick [shows with fingers]—of, you know, single-page lecture notes. So all that has got to be done. And it's a nightmare in a way. On top of all that, your first graduate students usually are not the best you are going to get. Our procedure—that's what I found—was that incoming students were told to go around and interview every faculty member, find out what they're doing, and decide which one they wanted to work with, if he or she had a place for them. Now, I hadn't participated in the selection of these students to be admitted in the first place, so I had no backlog on that. All of this is done beforehand, a year or so beforehand, when students have applied. They had been looked over, their CVs have been looked over and whatnot. We'll say, "Admit this one, that one, that one," and in some cases singled out, "It looks like I'd like to have that one because he looks close to what I'm doing." So I didn't know any of that. And so the marginal students, by and large, are the ones that you're likely to get the first time around, because nobody has really zeroed in on them, and they've still got to land somewhere. So my first students weren't all that hot.

Wilmot: Which is kind of difficult because, as I understand, some parts of the way that your accomplishment as a professor is measured is in part a reflection of kind of the way your students, graduate students bring honor to you by their accomplishments as well. Is that correct?

Bragg: Yes, yes. Initially, of course, there may not be time for them to emerge as their own person. But to the extent that they grind out the publications while they are there, that is very important. And that, you can't evaluate almost immediately. Well, it takes maybe a year or so after you submit a paper for publication before it's actually published. So—and there's another thing, to get the pipeline full. If you start off from scratch, nothing of any consequence is likely to appear for a whole year, no matter what you do. Even if you had the paper when you came in, even then if you submitted a paper, it's going to take a year before it shows up. So you're not going to look all that good to start with, regardless.

But on top of all that, once I appeared on campus, and I don't know how this came about, but it may be I ran into Harry Morrison. But while this is going on, the black studies program is fighting to get established. And it was like—I have to think of some words to describe it—but basically there had been appointed, quote, a “coordinator.” That was Ron Lewis. And they had a small secretarial staff. And they were offering courses, most of them almost extemporaneous courses, because there was no real scholarship there at that time that I was aware of. At that time, for example, there, St. Clare Drake was at Stanford, but there was nobody like St. Clare Drake at Berkeley. Andrew Billingsley was there in sociology, who could talk about the black family. Troy Duster might have been in sociology then, and Harry Edwards probably was in sociology. If not, he came immediately afterwards. But they were not in black studies. Who was teaching these courses, I don't know. They would get people who in some way—and they were all courses in sociology, or history, or the humanities generally. And also because they have to do things that eventually get the approval of the administration, the university administration, and also support, because most of the white faculty on campus could care less or just as soon not be heard that there are these programs down there which really belong over in sociology or English or somewhere else. And it's true, if they had done the right thing they would never have had to do that. [chuckles] Maybe even that's not true. But at any rate, they are looking for all kinds of senior advice they can get that will be helpful in dealing with their problems.

Wilmot: Black studies department, or—?

Bragg: Black studies. So what they did was to recruit black faculty to the extent that they could, or people from the community into what was called a policy review board. Essentially it was a board that would hear issues that were raised by the coordinator and try to give advice that was useful. I remember lots and lots of arguments that showed that the people who were recruited into the program's activities thought the university was a political body, and their idea of what to do was to go out and work in the community. I saw some evidence of that in Bill Banks' book, incidentally, some reference to that. Well, that happened a fair amount. People felt like what they were really for was to go out and do something in the community, and what the administration thinks, the university thinks is that they're here to teach people. And not go out and organize the community. So that didn't help much.

Even the people like the publisher of the—now, it's a black newspaper, in Oakland—

Wilmot: The *Oakland Post*?

Bragg: Yes, the *Berkeley Post* and the—I forget the guy's name, he's dead now.

Wilmot: Tom—

Bragg: Tom Berkley, who was a real arch-conservative, at least it seemed that way. But even he sat on the board from time to time. But I think Harry Morrison and I, for a while a guy from law, Wilkins might have been, I wouldn't be surprised if what, David Blackwell served as well. So a fair amount of sober-minded or at least even-handed people who served. I think—

Wilmot: When you say sober-minded and even-handed, what does that mean?

Bragg: Take back the sober-minded. By even-handed I'm saying not carried away with a lot of revolutionary rhetoric. Trying to look objectively at the issues and see, given that we more or less feel like we're all headed the same way, how can we cut out the rhetoric and get there. Rhetoric, believe me, it abounds. [laughs] Believe me! Paul Cobb once said if he had his way, he would pass a law that would prohibit black people from taking any courses in rhetoric for about three years. [laughs] Cobb was not on the faculty, he is an activist out in Oakland. But his point was, you've got a lot of—I used to wonder, “What is the difference between rhetoric and English?” When you see these lists of courses that you could take for equivalents, you could take English or you could take rhetoric. I said, “Well, I don't see how that's the case.” And I finally found out after looking up the words and the definitions, English has to do with making declarative statements, that you describe something. But rhetoric has to do with winning the argument. [laughs] So that's the difference.

Wilmot: And you found out there was a lot of rhetoric in the community.

Bragg: There's a lot of rhetoric, believe me! [laughs] But in any case, that was interesting—

Wilmot: Rhetoric coming from—?

Bragg: From the people who had been recruited, just about everybody who had had a radical or revolutionary, or even a protest-related thought, and was articulate, wound up coming around. So there were plenty of people around with lots of rhetoric about what was wrong and all that.

Wilmot: And this is for the policy group.

Bragg: Well, no, I'm saying that people who were in the black studies program itself, as staffers in one way or another. The policy review board was a lot more objective, I thought. Not totally, but certainly more so. And I guess the only thing, the other that sticks out in my mind was for one semester they managed to—or quarter, I can't remember which, but—they got Alex Haley to come and spend a scholar's residence in the black studies department. And his book, *Roots*, had not been published then. But I remember when he came to one of our meetings and was introduced as being the scholar in residence, he was going to talk for about five minutes and wound up talking about a half an hour or more. We just didn't want it to stop, it was such a spellbinding story that he was telling. And of course it got modified, I heard it sometimes later, always spellbinding of course. But Alex Haley did spend one term in black studies there.

The other thing I remember that I felt pretty good about was—well, a couple of things. Margaret Wilkinson and—I forget her buddy—but the two ladies were trying to start some kind of a program in the arts.

Wilmot: Where did the other person come from?

Bragg: Berkeley.

Wilmot: Her buddy.

Bragg: She was locally from Berkeley. She wound up at Davis, I forget her name now. I think it was Irene something.

Wilmot: Was her name Joanne Harris?

Bragg: No. But they were looking for a place to put art they had collected, sort of like a museum. I remember, of course it's not much, but picking up the tab for luncheons, a few luncheons and things, since at the time I was a member of the Faculty Club and they weren't. That was really trivial, though, come to think of it, but at least I was trying to encourage them in what they were trying to do, let's put it that way. They needed somebody to get that done for them, and I could.

Another thing that comes to mind was when—oh, Ron Lewis, who was the coordinator, talked to Harry Morrison and myself about his concerns that we had tons and tons of revolutionaries, but nobody knew how to run the ship. That isn't the way he put it, but basically there was no recognition that science or technology played any role in anything, that somehow magically, if you could just get political control, then everything else would just work out fine. And of course I didn't have that notion at all; I knew it was not true. In fact, I had noticed years earlier that when the African countries began to get their independence, they sent lots of guys out to get educated—they didn't have universities themselves then. And invariably they wanted to go to the London School of Economics and come out and be a minister, just like the white guys that were pushing them around before they got independence. Nobody wanted to mind the store and see that the water came out of the faucet, or even they got water in the faucet. So it was much later before the Africans began to cut back on producing statesmen and start to produce engineers, and then more belatedly, scientists.

So I was aware of this problem in the developing countries, and also in the black community, since when you looked at the statistics, the demographics, the statistics, we were much better supplied with our proportionate share of ministers, for example—I'm talking about preachers—I mean, better than white people, per capita. Not too bad off with social workers. But when we got down to the professions, we were woefully underrepresented. And that's more or less, if you want to make a profile of a developing country, that's what you'll find. So here we are.

But we're at the University of California now, and these people ought to be aware of the fact that it takes more than speeches to get electricity and get a dam built.

So when Ron Lewis broached the subject to Harry and myself, we said, "Yes, we can do do that." We talked it over and decided we would just do it without even consulting our

departments about it. I'm not sure whether Harry had joined the faculty or not, but he was a director of the Lawrence Hall of Science, so he was always around campus. Even though he was stationed out more or less at Livermore, he would be around frequently. And I had met him earlier in Denver.

So we decide we would put together this course on the "African American Experience in Science and Technology," I think that was what we called it. And the question was, how are you going to do that? And we decided the best thing, that one way to do it was to look at the broad areas of science and technology and run what amounted to a survey course, where we recruited, always, black people working in these areas. And then for, say, for a three- or four-unit course, we would have one day for discussion, what did it all mean and all that? It was quite a nice thing to do, because we found between us, and stuff we could get from other people, we could just about run the gamut from A to Z. If not that far, certainly enough to fill up a fifteen-week course.

Wilmot: Let's take about two minutes break, okay? This will take a quick minute.

Bragg: Okay, fine.

[interview interruption]

Wilmot: So were talking about the class that you taught.

Bragg: Yes, Harry Morrison and I.

Wilmot: With Harry Morrison, it was after—

Bragg: I or me?

Wilmot: Is this the class that you taught with Harry Morrison?

Bragg: No, I can't remember whether to use I or me in that situation. It's just a thing about the English grammar.

Wilmot: Oh, okay.

Bragg: Nothing to do with—[laughs] Just correct speech, that's all.

Wilmot: Afro-American Experiences in Science and Technology. So how was that class received?

Bragg: Interestingly enough, the only registrants were persons who had a science major. None of the humanists saw fit to register in it. So these students, none of them were majoring in Afro-American studies. Well, that was kind of a disappointment. But on the other hand, it was all right because many of them were on the very bottom end of their careers in science, had no idea about the scope of black participation in science or engineering. So it was a great education experience for them.

Wilmot: Were they African American?

Bragg: Yes, they were all African Americans. As I said, they were all in biology, or ophthalmology, something like that, something technical. So they, we didn't need to come on [laughs]—and they wouldn't have anyway—with a lot of revolutionary rhetoric. We just did like it was. And what we did, we found we could, in the Bay Area, recruit all kinds of scientists and engineers, a lot of them right there on the campus, to come out and give a thirty-minute- to a forty-five-minute talk. Oh, they were just fascinating! We enjoyed it as much as the students. From architects, biologists, botanists—there was a black guy who chaired botany at the time [O'Neil Ray Collins], Ken Simmons was there in architecture.

Wilmot: Ken Simmons?

Bragg: Yes, he's now gone. He's gone to Africa. Ken Simmons was a professor in the architecture department. We didn't have anybody in chemistry at the time, but now I forget, we recruited—I think we recruited a female chemist. It was probably Margot Hicks. Mathematics and statistics, we had Blackwell, Harry did physics, I did materials science. We had a guy who had been involved in the water department, brought the water all the way down from the Hetch Hetchy Reservoir to the Water Temple practically. And even Eileen Hernandez, I forget what she did, but she spoke. She at one time was the head of NOW [National Organization of Women].

So it was a great experience. It blew their minds, it's all these heavy black people, right in our midst and nobody even knows who they are. But eventually the time comes, [laughs] you've got to offer a grade in the course. So how do you grade them? And we stewed about this. We finally decided we would make it an essay kind of exam, but compel them to do some thinking. And what we came up with was an idea where we would do two things. One is compel them to think. And second, to teach a lesson that revolutionary rhetoric is one thing, but that doesn't mean that people are going to get clean water. We were aware of things that had happened—this is now like 1970 or '71—Ghana had gotten its independence in 1955, I think Nigeria had already become independent even, so—. But mostly what had happened to these African countries is they had gotten political power. But they found that they hadn't got the technical infrastructure to run the country, even at that low level of development, let alone rivaling Europe. And what they found was they fire all the white people, like in Uganda, they fired not only the white people but even the Indians, throw all of them out. And now nobody knows how to run anything. So far from things being improved, they got worse. Now they had to go and hire these people back, at least to get things going.

So it wouldn't have been any different, when we thought about it, in this country. Or how different would it be? Now, that was the issue then. It just turned out that at that time there were just about as many people in the state of California as there were black people in America. And we could go to the Department of Commerce, Bureau of Labor and Statistics, and get statistics on the numbers of blacks in all the major fields. So it would give you an inventory of what you've got to work with. Medicine, law, and agriculture, name it. So what we did was to give each person a task. Say you're the minister for medicine, let's say, a newly created—we run all the white people out of California, but don't touch a thing, don't destroy anything, leave the whole infrastructure intact, but run all the white people out, and let's move all the black people in. And now you're the minister for medicine. Here's what you have got to work with, how are you going to take care of our health? Or you're the minister for engineering, or highways. It

was to supply them with an idea about how much they had available to run a country with, or a state with, compared to what it took the way things were. And to see, well—the first thing we're sure of is they're going to get a real shock, discover how bad the situation would be. And second, to see if they had any creative ideas.

Well, some students turned out to be fairly creative. They didn't guarantee we wouldn't suffer, but the suffering could be mitigated by some recourse to reality or practicality. And what I remember most was when it came to medicine, this student apparently had read a lot on what had been done in places like Tanzania, and in places like China, as well, where the general level of medical practice was still not up to Western standards. But a lot of things you could do that are done now are overdone. For example, in the old days when you got a cold you drank some chicken soup or something, and after a while the cold went away. By and large, colds don't kill you. People had all kinds of native remedies. "Go get some sulfur and sugar and make a mustard plaster on your chest." [laughs] It smelled like hell, but it probably did some good. In other words, there was a lot of indigenous medicine that was available. Plus, also even modern medicine, much of what we do, we go to the doctor every time we get a little prick on the finger. And they go to a specialist when we often don't need that either. So what they found was that in places like Tanzania, China, that people were trained to be medical technicians who would be armed with a decision process, whereby a few fairly simple tests that they could administer, examining the patient, eliminate this, that, that, that, that and that. And finally come up with a diagnosis that would cover a very large fraction of all the common ailments, and those they knew how to treat, they would have drugs for that. If that didn't work out, then you go to Plan B. So the demand then for a real specialist was reduced, but they were probably operating way below what they were prepared to do anyway in modern society.

Wilmot: The specialists were?

Bragg: Yes. Nowadays, even your medical doctor, for example, I've talked with my physician about—I forget what it was, maybe it had to do something with urology. He said, "You know, I learned how to treat cases like this in medical school." But, he was in Palo Alto now, and if I did that here, the specialist would kill me. Not literally, but he would become a pariah. Because that is a thing you passed on to a specialist. And much of what we have in medicine today, much of the excessive costs we have in medicine—forgive me if I offend somebody, but some of the cost that we have is just too much specialists, and too few country doctors. Of course, nobody wants to be a country doctor because you don't make any money. But anyway, that's a digression.

The point is that some students turned out to be rather creative, and some were just very despondent. "I don't see how we're going to make it. What can we do?" Well, it's too bad we couldn't have had a follow-on, because they could have said, "Well, there are things we can do, we can train people." For example, during World War II, the technical machine that we wound up with in four years didn't exist, even in anybody's mind, when the Japanese attacked Pearl Harbor in '41. People learned trades during World War II in technical schools, in the army, or as civilian employees, that they could've learned all along, they just never had gotten around to doing it. In some cases, almost illiterate people. I was told by somebody that he was teaching technical jobs in oil fields to people with—right off camels—[laughs] they couldn't even read and write, but still learned to do these jobs. So it's a question of mobilizing properly. Some of what we

have, the backwardness we have is not intrinsic—it's a lack of proper mobilization. So some of the despair that we ran into was based on the lack of a full appreciation of what is possible, not that it's likely to happen, but that shouldn't make you despair.

Wilmot: Your course sounds very radical.

Bragg: Well, it seemed to me so practical! Our problem was, you see, that the people who took the course, we were preaching to the choir. The very people who should have been—for example, if you go—this is not an example, but to jump back to what this leads to—it sort of goes back to Booker T. Washington, W.E.B. Du Bois. I like it, Du Bois, this is French, you know. [sings a tune] “*Courier Du Bois*.” Well—

Wilmot: What is that from?

Bragg: It's from Nelson Eddy-Jeanette MacDonald something-or-other operetta. I forget the name of it now, but—

Wilmot: It's something about the woods?

Bragg: Yes. Well, the revulsion that set in against Booker T. Washington's “Educate the Hands” philosophy got to the point where nobody wanted to have a child who learned to do anything technical. Everybody wanted to have children who were brains and who—the minister complex which went with newly emerging African nations. Everyone wanted to be a minister and sit in an office and wear a suit and a tie.

Wilmot: And you're speaking from within the African American community?

Bragg: I'm going on to say that when I—I'll give you the example that really gets to my point. When I arrived in Oakland, in Berkeley, and became aware of Oakland Technical High School, I assumed that Oakland Technical High School was the kind of high school I had gone to where you had a technical orientation. But no bones about it, you weren't preparing to be a philosopher. You were going to go into science or engineering, do technical things. And the background went accordingly, but didn't mean you couldn't read and write. You had the humanities and all of that. Nevertheless, you had to learn something about mathematics and science, that's physics and chemistry, and even shop. Learn how people actually do things. Not that you had to become an artisan yourself, but you could if you wanted to.

Well, in Chicago, when I arrived there in 1933 there were three technical high schools. The one that I attended, there were very few black students there, even though that's what we needed. But there was DuSable High School which had an academic thrust, Wendell Phillips, which was the same thing, and I think Inglewood High School, maybe. The point is that they more or less already are shunning this vocational kind of mentality. It was not until years later, I think during World War II, that Dunbar Trade School, not Technical, but trade school, was formed. Eventually became a technical school. And there finally we had students who set out to learn to be a tailor or a carpenter or an electrician, whatnot. It had got to the point where—it's a huge place now in Chicago on the south side. Their graduates wind up out into jobs. No lack of jobs, because they know how to do something.

But anyway, I'm kind of digressing. But my whole point is that, the people who you look to lead and give counsel and wise counsel should have been, and should be to this day, counseling students more to put in the effort, learn some mathematics, learn some physics, learn some chemistry. And you may not want to do that, but don't cut yourself off before you even get started. Don't—the way it happens now, [laughs] you can make a choice at the tenth grade not to take any more math. Well, that just about cuts you out of everything. So don't do that! To this day we have, I'm sure, counselors who still pay no attention to that whatsoever. That's a digression, but anyway, it's something that's close to my heart.

Wilmot: I mean, it makes sense, especially if you're thinking about what it means to make a community strong that's been historically really weakened. It makes sense that you're thinking about these issues of basic infrastructure and human resources in the true sense of that word.

Bragg: Believe me, without it you don't have anything. You could go—and we could go on with this for days—but I was in Nigeria on a Fulbright some years ago, almost ten years ago now, God! And being in materials science, naturally I was curious about what was going on. And there were some there who had good degrees from places like Cambridge, the King's College in London, and so on. Also, one thing I had noticed in developing countries was that invariably they had raw materials, but they exported to the European former protectorates, to France or England or Germany, or Spain, where they were then turned into manufactured goods, and then exported back. In Ghana, for example, the aluminum—in Jamaica, for example, the biggest cash crop there, apart from rum and tourism, is bauxite. The Jamaica Bauxite Institute is a government-run facility to watchdog the quality of the bauxite that's dug out of the ground and chemically treated to purify it, whereupon it's shipped out to different places where the aluminum companies, Alcoa in particular, have smelters, to be made into aluminum metal. And these big chunks, ingots, of aluminum metal are taken to mills, where they are made into sheet, and bar, and stock, and all that. But the point is that there's no reason why the smelter and the mills couldn't be right there in Jamaica. Why do they have to go all the way back to England or to the U.S.? The same way with Ghana. Why does Ghanaian aluminum have to come to Kaiser when they could make aluminum sheet and the pots and pans right there in Ghana? It's all a question of colonialism. So you're stuck if you can't do that.

Well, I started out to say that—it's not an original idea, of course. My friends in the physics department at the University of Ife, where I was, had started a program of offering coursework in materials science. And that was the brainchild of Francis Oluwole, who had got his Ph.D. in physics at Berkeley, but had had to take a course in materials science, for some reason. The idea was that if they offered an option of materials science in the physics department, that would get student who might normally go into some esoteric field of physics, to focus on things that could have an immediate impact on the country. After all, most of what you do requires materials, raw materials. So the chemical engineering industry would take care of chemical processing, but other than that you have metallurgy and you have ceramics. You need these. So their feeling was that there were two basic things you needed. One was materials for manufacturing, and you had to have energy, because sooner or later the oil would run out. And so the next thing that made sense was nuclear. So they had options in nuclear physics and

materials science. And actually, I helped set up the first offerings in that, in terms of equipment and so on, in that department. It's still going on, incidentally.

But anyway, all that's to say that the people who should have been there taking that course never were, and so they are out leading people. And I say that cynically. [laughs]

Wilmot: Okay. I have a question for you. I noticed that you frequently reference countries in Africa and the Caribbean as parallels to what happened here in the African American community. It reminded me of that movement, the Pan-African movement that took place in the early 1900s, and it made me think about that. I wanted to ask you this question going way back, and it's a very logical parallel, it's not so much that parallel that I'm looking at, but—

Bragg: And it has a tragic follow-on in this sense. I'm aware the early Pan-African meetings were attended by a handful of people, in London, for example. People who eventually became heads of state when these countries got their independence. And there they were concerned with independence, getting the white man out, that was as far as they could see. Du Bois was certainly a ringleader. I'm thinking of people in Kenya—but anyway, the point is that those early meetings, Pan-African conferences, were essentially political. Back in the early—coming up to the early seventies, the Sixth Pan-African conference was organized to be held in Dar Es Salaam or maybe it was Addis Ababa, I don't remember, somewhere in east Africa. And I was interested in going, and went to a few organizational meetings.

There were, by this time, a subset of people concerned with technical matters. But I saw—it turned out very quickly that the thrust of the thing was so far removed from technical concerns that not much was going to come out of it. I remember we had a few meetings, it looked like we came up with some really sound proposals of things that ought to be done and looked at. But I dropped out when it became clear to me that it was going to get bogged down in revolutionary rhetoric, and I just didn't see how much good was going to come out of it.

I remember one time, I went to one meeting at Kent State, where Frances [Cress] Welsing was there. I'm not sure what she represented—but a powerful personality, incidentally, if you've never run across her. She has lots of theories about melanin as being an important ingredient in the whole focus about black-white animosity, black-white relationships. But anyway, I remember her dominating this particular session. Well, I won't go into the profanity, but I couldn't see what that had to do with anything. I think people get sort of hung up on the revolutionary spirit, anger or rage, and it's kind of hard to focus. At least it was for me, and so I didn't pursue that, I didn't go. It's sad, but there were too many people out to out-black each other. That of course always leads to—I think it always leads to not very much.

Wilmot: It's clear to me that this is a very central part of your awareness, and I'm wondering when did a Pan-African kind of consciousness start to come into your life? You mentioned that you had read Toussaint L'Ouverture when you were little.

Bragg: Well, in high school. I guess once you become aware of the under-recognition, under-performance, under-recognition certainly, under-utilization of black talent, and also the subordinate role and the presumed inferiority of blacks, you begin to—if you don't

really feel that, you don't really internalize that, then you begin to think about, well, how you oppose this, or what do you do about it. So something that legitimizes blackness—that dignifies, legitimizes you as the equal of anybody else leads to the sort of thing like Pan-Africanism. In that case, of course, it's quite clear that—and the Caribbean in particular—even before the white people actually went in and began to colonize or make protectorates out of Africans, they had already done this to the Caribbean. So I think in terms of the historical progression, it was only in the late part of the 19th century that the white people divided up Africa. Up to that point they just went out and took slaves from it. But the notion of countries that consist mostly of black people being run by a handful of white people would probably go back first to the Caribbean rather than to Africa itself. But once you do that then you begin to recognize that basically it's all against Africans. [laughs] So I can see that you're going to be lead to some kind of Pan-African ideas if you think about it a while.

Wilmot: When did that happen for you?

Bragg: I don't know at what point, how far I went, but I always—I can remember taking a course, I guess it was history in high school, and I remember saying something in class about Toussaint L' Ouverture. This is high school, now, and here's this black kid—

Wilmot: You.

Bragg: Yes, me, telling this white teacher about Haiti being conquered by these black people. She doesn't know a damn thing about this, not even the teacher, let alone the students! So I must have been to some extent [laughs] already in there, way back then. And of course, I didn't get a good grade either. [laughs] But nevertheless, it didn't tell me I was wrong, it just taught me she was wrong, that she didn't know.

No, but I'm not sure I can give you a better answer to the question, except that I've always had this feeling that once you began to think of the plight of black people in America, and then you look at how they have been viewed both as everyday, the man in the street, or even the intellectuals in universities who told them what to think, you are always confronted with this business of inherent inferiority, or the notion of that. And if you don't internalize it, then you're obviously going to be opposed to it. So you're led to think in terms of the broader sense of, well, you're inferior because your people back in Africa are inferior. So you came from nothing, and you're nothing. So it's hard not to become a Pan-Africanist [laughs] once you do that. I mean, whether you give a name to it or not, that's the way you think it's going to go, so—.

Wilmot: And that's the way it happened for you?

Bragg: Yes, pretty much, yes.

Wilmot: Okay. This is very interesting. I have another question for you, and it's kind of just redirected back to Berkeley. When you came to Berkeley, you immediately, it seems to me from listening to you, it seems to me immediately that you were kind of drawn into very, very close proximity with the political kind of upheaval that was happening there. If there was another person that was like you who was coming into Berkeley, what advice would you have given to that professor, in terms of survival, or just how to flourish, or succeed?

Bragg: Okay. The first thing I would do would be to tell them to get a hold of the faculty handbook, because that tells them pretty much what's expected of the faculty. I didn't get one until I became a department chairman! I came there in '69 and I got my copy of the faculty handbook, which I didn't even know existed. I should have known, but I didn't until '78, nine years later. Because the handbook tells you, "Here's what your faculty duties are." You have a look at the whole organization. That is going to be the first thing. The second would be I would have a heart-to-heart talk, as much as I could, with the department chair. Not that that wouldn't have been done already, but to make sure to get his perspective on how I fit in the whole thing, what's expected of me.

The third thing I would do would be to make sure that the person understood that in the university your first role is to—that the department exists for a certain, specific purpose. It's rather broad, but it's not there as a political animal. It's there as the law—the legislation that established the university in the first place said—that it was a place for the education of young men, and extend that to women, in the agriculture and mechanic arts. That's what the university is for. It's not to make you a philosopher or a thinker. It's there for the service of society. Now, it gradually got expanded to take in the humanities and the social sciences and so on as part of the whole. But basically the university, the state university at least, is derived from the old A&Ms. So that came back from the days when it was realized that you had to have engineers to build automobiles and tractors for farms and things like that. And of course you had to feed people. So everything else sort of flows from that.

So, but given that now, that mission has been raised to a higher level of abstraction. Because you're not there to learn how to make cars, but the knowledge behind what improves cars, or more exactly, the whole basic science of mechanics is at issue. Once you have these principles understood, then you're adaptable to things that are necessary, and you can now invent. And that's the other thing. The university is not only there to pass on these arts and sciences, but to make new science. That's why the university offers Ph.D.s, and the state colleges don't. It's the law, that's why. It's in the law. And you're there to do these things. So that's your very first requirement, and you should make sure you cover that base.

For a black person you've got another problem, and that is, whether you like it or not, and I don't think you should dislike it, but you sort of automatically inherit a responsibility to help others along. Now, you can do that in a number of ways. You can go out into the community, give speeches, try to promote people into your field, do that. Judge at science fairs, do all kinds of things that stem or are derived from your expertise. Not just because you can make fiery speeches, but you have something to offer that society needs, and constantly uses. But also, there are students right there who are maybe confused, who don't have direction, or maybe who just need encouragement. They have to have, they like to have somebody to talk to who has been there, who is better prepared to be specific rather than say, "Yes, try hard and you'll make it." "But how do you make it?" and so on. "How does the system operate?" So, that I would pass on to any incoming faculty member that you've got to do your own work, you've got to succeed in his terms. And where you can you reach out and bring in other people, and try to make a contribution that way. But you don't want to sacrifice the time that you need to do well, because if you don't do well you won't achieve anything, and you won't be anywhere, nothing will have happened. So that pretty much broadly encompasses what I would say.

Wilmot: That's advice you would give a young you, or someone who is just entering the academy?

Bragg: Yes, find out what the rules are, make damn sure that you do your part and you hang up your shingle, you get out front in what you're doing. And be open to help where you can. I think if you do that, use those tenets more or less, the individual things will take care of themselves.

Wilmot: Let me ask you something also. You said that a significant part of your coming to Berkeley or being hired at Berkeley had to do with the political climate at that time, with the students clamoring for a black faculty. I was wondering when you came to Berkeley, did you ever encounter from your colleagues, other people, other faculty—

Bragg: Who thought I was there because of that?

Wilmot: Yes.

Bragg: Well, nobody said that outright. In fact, in my particular case, I don't think I was forced on the faculty. To put it another way, if that was the case, it wasn't very overt. I was the first—and forgive me, this is not bragging, I'm just telling you a fact—tenured black faculty member in the College of Engineering, which had 200, roughly, tenured faculty since before World War II. I don't think we had but one other black one since, and he didn't last too long.

Wilmot: You were the first tenured black faculty member?

Bragg: And that's awful, but it's true.

Wilmot: Were you the first tenured black faculty member since World War II, or the first—?

Bragg: In the College of Engineering.

Wilmot: Okay.

Bragg: No, not in the whole faculty, but the college of engineering. And not only that, I don't think we had any black department chairs.

Wilmot: Could you say that one more time for the camera?

Bragg: Oh, I said I was the first tenured black faculty member in the college of engineering in Berkeley since before World War II. I think it's like, God knows how many years have gone by. There had been one guy who went to UCLA earlier, somebody, I forget what his name was, but there had been one black faculty member in—

Wilmot: J.T. Geier, Mr. Geier, Professor Geier, is that him?

Bragg: I don't know, but—

Wilmot: Joseph T. Geier?

- Bragg: He went to UCLA. I never met him, and he would have been much older. But there had been one earlier that I was aware of—from George Maslach who told me. But I was it for years, and years, and years unfortunately. I'm not sure what the question was.
- Wilmot: My question was, did you ever encounter any—?
- Bragg: The question is, are you there on sufferance?
- Wilmot: Essentially. Or did you encounter that attitude from your colleagues?
- Bragg: You don't need to have somebody come up and say, "I know you're here just because you're black." But the innuendos, not in my department, but that you found, like in going to meetings of the Academic Senate, which is dominated by campus politicians, white, it's something that's hard to quantify, but clearly the conventional wisdom was, "Well, we'll put up with these guys because we have to, we're going to make as few of them as we can." This became clear and I saw that meant, "Because they're not qualified." But nobody—[laughs] I'm laughing because of the experience—but nobody came and said, "Bragg, I know you're here because of affirmative action." Or to add to that, "It's too bad you don't belong here." Nobody ever said anything like that. I don't think my professional competence ever was an issue. Now, it might have been, but you see, I was doing things that nobody else there was doing. So they might have felt it wasn't all that important, but not that it was incompetent. And that unfortunately is a characteristic [laughs] of all intellectuals. "Well, what you're doing is great, and what he's doing is okay, but it's not all that great." So that wouldn't have anything to do necessarily with ethnicity, it's just the way faculty people think. Whatever they're doing, that's it, the world will rise and fall over what he's doing, but, "What he's doing, that's okay, but—"
- Wilmot: Why did you laugh to yourself—?
- Bragg: Well, the reason I laughed is, Bill Jackson, who is now a chemistry professor at Davis, UC Davis, had been at Howard University for quite a long time, and a very good friend of Harry Morrison. They both had attended the same graduate school at Catholic U. in Washington. Bill Jackson is a very bright guy, a very ingenious, inventive guy. Highly intuitive, too. Just great physical intuition. And has tremendous respect for Harry Morrison, because Harry is a theoretician.
- Wilmot: Physical intuition?
- Bragg: Physical intuition. It means that you can just look at a problem, and without having to go through a lot of mathematics and so on, kind of see the way things will go. Some have it and some don't. Michelson was a good example of a guy with lots of—and there are lots of other examples.

But anyway, one time he told me, he came over to the campus to see a guy over in nuclear engineering who was doing some work in nuclear chemistry that Jackson was interested in for some reason. Well, they are in different locations on the campus. But knowing Harry, he looks Harry up when he comes over from Davis. He says, "Look, I'm going to go and see this guy in nuclear, why don't you come and go along with me?" Harry says, "Okay, I'll go, I've never been over there." So they go over to this guy's

office for Bill Jackson to talk to this Berkeley faculty member who was white. And Harry just sits there. So they're talking, and every so often Bill says the guy looks over at Harry, (they had been introduced already). But that was all. And he said, "I know what was on his mind, he's wondering—'What is he doing here, what is he doing?'" So the guy can't contain himself—he finally asks, "Well, what do you do with physics?" [laughs] And he said, "Harry picks up a piece of chalk, goes over to the blackboard, proceeds to give about a half an hour lecture with lots and lots of equations. And he puts it down and says, 'That's what I do.'" [laughs] The guy never should have asked him.

But the point was, this guy can't believe this black guy belongs there, as educated as he was. I don't think he was a racist. It just is not something he's used to, not having had any experience at all with Harry, he doesn't know who Harry is. He's just an ordinary—Harry never went out of his way to look professorial, either. It looked like he was just kind of off there, you know. [laughs]

Wilmot: What did he look like?

Bragg: Well, you'll see a picture on the back of that brochure that I gave you there, you'll see, it looks pretty much the way Harry looked most of the time, except that he wouldn't have a coat and tie on he would have—he would probably wear a coat, but with a velour sweater, an open-neck sweater. I never saw him without a book, and maybe some chalk dust on it. But he kind of looked like the absent-minded professor, but he didn't look like a Berkeley professor, [laughs] because he was black. So as I say, well, this guy, he just can't contain himself, and asked Harry what he did. Rather than explain to him, he just demonstrated what he did. Started out with some basic ideas, and then gave about a half an hour lecture [laughs] and puts the chalk down, said, "That's what I do." Well, I'm sure he made a believer out of this guy, [laughs] and he'll never ask that question again.

But the notion that somehow you're not qualified is kind of hard to—to this day, probably, it's not totally vanished from the scene. I remember sitting on a committee of the National Science Foundation, the materials research advisory committee. I had sat on that committee for five or six years. And the NSF supports about a third of all the materials research that is done in this country, which runs in the hundreds of millions of dollars. And the money is coming out of that division. And of course to help the staff, which is rather small, decide how to spend the money, where to put it, they need an advisory committee drawn from people who are senior and—not all necessarily senior, but who represent considerable, significant constituencies. So there's going to be a guy there from MIT, there's going to be a guy from Stanford, a guy there from Berkeley, and so on. So the major institutions are going to be represented on that committee. Well, I had already been on a NASA committee having to do with materials processing in space. I knew some similar types of people from that committee. Also, I guess when I went to spend a year in the DOE office in Germantown, where another third of all the money came from, I got to be well known and was invited to serve on this committee, both are around Washington.

But anyway, so I'm on this committee, and I remember we'd have these meetings, and there was this guy who couldn't contain himself. Finally after several meetings he asked me more or less, "Why are you on this committee?" I said, "Well, you know, affirmative action." Well, [laughs] he kind of turned red in the face. "Yes, but—" He

said, "Yes, but—" [laughs] So it's clear the notion was there. "I don't know this guy, who can he be?"

Wilmot: I'm glad you gave it to him.

Bragg: Well, I couldn't help it. He asked for it, so I gave it to him. And as a matter of fact, I'm not sure that's the only time I ever did that. When you get that kind of question, you should expect that kind of answer. "Yes, well, you know, affirmative action." Now we'll both get down to brass tacks. But up to that point, he's got this image that you're inflated, see? [laughs] So you just take it down a bit.

Wilmot: When you first came to Berkeley, the offer that you received, was it a tenured position?

Bragg: Absolutely! Wouldn't have left Palo Alto without it. I had been coached at Lockheed by people who had been in academia and later retired there. They said, "Whatever you do, don't go without tenure. Don't worry too much exactly where you are, because once you're in," as one old prior academic told me, "they take you in." He was a German Jew. "Once you're in the faculty, they take you in." Which meant that once you become part of them, then everybody is expected to rise. So since your rise doesn't come out of his pocket, so everybody wants to see everybody progress. In principle. But don't go in without tenure, because you don't want to go in having to prove anything. So the issue never came up. I was prepared, if the money was right I would have accepted an associate professorship. But it turned out, in order to match my salary, actually give me a little more money, they had to give me a full professorship. So it solved itself. I didn't have to sweat that.

I didn't realize what an issue it was until I discovered that so many black people on the campus were either assistant professors or lecturers, stuff like that. Some of them never were different. For example, Ishmael Reed, of course he wasn't there then, but I don't think he ever got a tenured position. Maybe he didn't want one. Margaret Wilkinson for years was a lecturer in the English department. She was good enough to do all kinds of things, but they wouldn't give her a tenured position. So finally she got mad and got ready to leave, and the university saw fit to find a slot for her, a tenured slot in Afro-American studies.

But no, tenure is—tenure at Berkeley, and at many places, I guess, means associate professor or above. You could find people who were professors at private schools that might even have had tenure, but didn't have security of employment. I'm not sure how that could be, but you run into a lot of people who taught at Harvard, for example. Harvard has kind of a revolving door. You can come in and teach a year or two, you know they're not going to give you a job, but you go out, it looks good on your resume. And people think that you're a brain, but—gee, you might have been—but not everybody who taught at Harvard, or Princeton, or Yale, was ever a serious candidate for a full, regular faculty position.

Wilmot: Who was making a decision about tenure? When you say the university saw fit to give someone tenure, who would that be?

Bragg: Oh, there's a committee on privilege and tenure. But there's also a tenure process.

Wilmot: I know that, yes.

Bragg: That is decided in the departments, at the department level. Most of the—99 percent of the decision occurs there. Not always. Basically—first of all, the position that you're in, tenure means security of employment, means being regularly budgeted in the university's budget; it's expected you're going to be there until you pass on. Temporary positions, no, they come and go, and may be soft money or may be hard money. Well, not hard—but soft money. But the tenure, it's called the tenure track, because the presumption is if you're hired into a tenure-track position, it means that there is expected to be, sooner or later the person will make tenure, and if you do the right things, you will get there. Now, what are the right things? Teaching, research, and service. And who decides that? Well, mostly your department.

Wilmot: Your colleagues?

Bragg: Yes.

Wilmot: For my last question for today I wanted to ask you about your department. Who was there when you got there? What was the atmosphere like there?

Bragg: Who was there? Well, mostly they're all gone. [laughs] But the chairman was Douglas Fuerstenau—no, no, I'm sorry, Jack Washburn was the chairman. In metallurgy there was Earl Parker, Victor Zakay, John Dorn, and Marshal Meriam, who I think might actually have been in India temporarily. Gareth Thomas, and I guess Allen Searcy, Joseph Pask, P-A-S-K, Joe Pask, and Richard Fulbrath. Of those, John, H-U-L-T-G-R-E-N, and there was one other guy in extracted metallurgy, (Fred Ravitz), which meant like blast furnaces and stuff like that. Did I mention Fuerstenau?

Wilmot: Yes.

Bragg: And Kal Sastry, S-A-S-T-R-Y. And Tom Mika, M-I-K-A.

Wilmot: Wow, a big department.

Bragg: Well, it's a medium-sized department at Berkeley. Just about between fifteen and twenty people, which is medium-sized there.

Wilmot: I think our tape is about done.

Bragg: Yes, fine.

Wilmot: I'm thinking we'll end for today. But the question we're going to start off on next time is what was the environment and atmosphere there, and what kind of collegial relationships were in the department, and any major kind of things that happened in the department.

Bragg: Okay, fair enough.

Interview 11: July 25, 2002

Bragg: —used to say UNIA meant Ugliest Niggers In America, because many of them were rather dark. And in fact they glorified blackness. Garvey himself was rather dark, and Negroid. But the point I was making was that I was a little bit surprised that Garvey wasn't a hero in Jamaica. But when I thought about it later, well, really, it was not surprising, because UNIA was not big in Jamaica, it was big here. So, ready?

Wilmot: Yes, and we are recording, I just turned everything on.

Bragg: Already?

Wilmot: Yes, just now.

Bragg: Take out the “N” word.

Wilmot: Oh, okay.

Bragg: [laughs] No, no, it doesn't matter, it doesn't matter. I'm not embarrassed by having said that.

Wilmot: Today is July 25, and we're here with Professor Bragg, interview number eleven. We're going to start today with where we left off. Yesterday we were taking about the atmosphere in the materials science and engineering department when you came to Berkeley in 1969.

Bragg: Right.

Wilmot: I wanted to ask you, what was that atmosphere like?

Bragg: Well, it was rather new to me. I had never taught anywhere before. No, take that back. I taught in the quartermaster laundry school in World War II. But that was quite different from mounting the podium in a major research university. Also, it was a little bit unusual in that typically, faculty are hired at the beginning of the academic year, which is July 1, but don't really show up to do any teaching and don't begin to teach until the fall, because nowadays we don't have summer sessions, at least not in the College of Engineering. But at that time we were still on the quarter system, so every three months you had another cycle. And somebody got the bright idea that I should get my feet wet by teaching a course in the summer, which was a special course; it wasn't in the catalog. I taught a course on small angle scattering, because nobody there knew anything about it, and that was something I was very much interested in.

So I gave the course. Some—the graduate students attended, it was interesting. And I became aware of the shortcomings of the research equipment in the x-ray laboratory because I tried to use that to enrich the course with some experiments, not many but a few.

Meanwhile I'm involved in other things like the Committee on Student Conduct. The question is, well, how am I going to fit into the teaching load of the department? What

that meant was that—the typical curriculum is printed in the catalog. The state mandates that you give those courses, that's what taxes pay for, and so they've got to be taught, unless nobody shows up to attend them. On top of that of course, there's usually soft money, or rather extra money for enrichment, things that you don't have to give every year, because—for example, it might be so new that it hasn't gone through the process of being incorporated into the catalog.

I wound up being, because of my presumed broad background in material science—I would be a good candidate to teach E45, which was an engineering college wide course, “E” meant engineering, it pertained to no particular department. That particular one was called something like “Properties of Engineering Materials.”

Wilmot: Why were you presumed to have a broad background, when it seems to me you had a very specific background?

Bragg: Well, that's the way it looks to the outsider, but in fact if you look at materials science, the scope of materials that are available, that our society sees is very broad. I started out working in cement, concrete, or cement/concrete. But in the process of doing that I had to learn something about clay minerals, soils. They are used in the manufacture of cement, and also sometimes in the applications of civil engineering, for example. Also, when you look at the pure compound, it's a branch of inorganic chemistry. So for the first five years I'm doing that and nothing else. But also I was involved in materials characterization. It's not only what's there, but why? What's the structure, and how it responds to various changes that you make? Add water to it, heat it, stretch it, whatnot.

But then, the next five years at the Armor Research Foundation I was involved in the solid state physics section of the foundation, the IIT Research Institute. And there, we were concerned with electronic properties of materials. That involves magnetic properties and optical properties, and semiconductors, insulators. Never saw any cement, never had to do anything with cement from 1956 on—cement was out. But now I'm over into a whole new venue, you see. Also, some radiation damage, so it puts me into nuclear applications as well. I run the x-ray laboratory there as well. But we had done studies of alkali-halide scintillators, these are materials that are used to make scintillation counters for a nuclear applications. So I'm into solid state physics now.

Then, when I went to Lockheed, I went in the metallurgy division, in the material science laboratory. But the part of it that I was most active in was metallurgy. And we also did plastics. So that covers all of it. So in that sense I was practically the only real materials scientist there, because I had been involved on a hands-on basis with every aspect of materials in one way or another. So who better suited to teach the introductory course in properties of materials that all the engineering students had to take? It didn't matter what branch you were going to go into, whether it was civil engineering, electrical engineering, mechanical engineering, nuclear engineering, it didn't matter. Sooner or later if you made anything at all, you had to make it out of something, and that something would be a material, necessarily. So that meant that an intelligent engineer, one well-trained with more than just a cookbook knowledge, should understand something about the properties of materials, and some basis for understanding what they are like and what you could do, without trying to make experts out of them.

It turned out, of course, that the scope of experiments you did was necessarily broad. So you would have electrical engineers who only wanted to hook up electronic circuits with voltmeters, and ammeters, would just freak out when we would have to do an experiment involving making some cement. [laughs] They couldn't see why they needed to know that. But that's besides the point. It involved all of that.

I had never had to confront that whole scope at once myself, but as I said, had bits and pieces of it, but now—

Wilmot: How did you do it?

Bragg: Well, you get a book by—I forget his name now [Van Vlack]. But anyway, there was a very widely used textbook for the introductory-level course on materials science, which we used. My job then was to give the lectures, organize the labs. The lab experiments themselves had been developed long before I got there. Twice, we would have labs in the morning and afternoon, there would be two sections, and I think they were four or five, four, one half days a week, so we ran a lot of labs. In other words, every semester every year, 500 students entered the University of California, Berkeley College of Engineering. That meant in every semester, there's two semesters, we'd run 250 through this course. So it was a fairly good-sized course, considering most engineering courses. And we necessarily had to have a lab big enough to handle all of that, and benches, individual benches, two to a bench. So it was a nice little exercise in organization, the first time around, it's not difficult after that. And you had graduate students who were TAs, plus some hired department staff. But it was quite an education for me to have to go through all that the first time.

Wilmot: And put it all together.

Bragg: Yes. That worked pretty well. That was just that particular course, however. The way it worked out, the course was team taught. That is to say, it eventually turned out that we stopped doing that. But there would be some lectures given by faculty from civil engineering who would do cement and concrete, some on electrical properties done by faculty from the Department of Electrical Engineering, and the rest would be done by ourselves. Now, the point of that was that the guy who was responsible for organizing the whole thing and all that would give maybe half a semester's lectures, and then he'd be free until time to do the final. The crafty old veterans, they'd teach that course because it gave so much time off. But of course in my case, coming in cold, it wasn't that much of a benefit.

Wilmot: What was your relationship like with the crafty old veterans?

Bragg: They were supportive. The crafty—what I have in mind was Earl Parker, who had been a department chair before, and actually had been responsible for making this course college-wide. See, if you go to a typical college that has a college of engineering, you may not find that there is a college-wide course in materials. Each department typically runs a course that focuses on what they consider important materials, and essentially ignores all the rest. And Earl Parker got the idea that the way to do this—that engineers tend to be pretty ignorant about materials except what they thought was important. But for engineers who are going to leaders of the future, it needs to be broader. So we should have a course that's fundamental, and bridges everything. So he was able to sell

his colleagues from way back when, from other departments, to join in on this college-wide course. So by the time I arrived there, it was standard procedure.

Now over time, there would be revolts, the civil engineers didn't want to learn any electrical engineering, and electrical engineers didn't want to be dealing with any shoveling, mixing cement and all that. So, from time to time, this would pop up. But I don't think they ever really got rid of it to this day. A good idea, I thought. It didn't please anybody, but it was good.

But that was part of it. Naturally, my real—apart from all my other breadth of experience, x-ray diffraction was what I did very well. So, that course is what I had to organize, and develop experiments; it hadn't been done before.

Wilmot: How did you set about doing that?

Bragg: Well, I was lucky in that the department chair—how he knew this I don't know, but the x-ray laboratory that they had went back to, not a faculty member, but a staff member who is kind of a jack of all trades. He could do a little bit of this, and a little bit of that. And the equipment was like going back to the turn of the century, practically. This is Berkeley, now, mind you! [chuckles] I mean, literally this stuff was so old some of it I had never seen, it was that old. And even the newer stuff wasn't particularly current. But the chair, who by now is Fuerstenau—

Wilmot: Douglas Fuerstenau?

Bragg: Doug Fuerstenau. Very soon after I joined the department, Doug became the department chair. Jack Washburn had been the chair when I joined, but Doug became the chair right afterwards. He took the department's budget and said, "Look, get rid of this junk in here and give us a nice teaching lab." Which was good, because I had the chance then to essentially build a lab from scratch.

What I did was to do a number of things that were good in that I was able to double, by getting used but good equipment, taken on just like you can buy equipment often and the vendor will take your old equipment and try to sell it to somebody who can't afford new equipment. It's like buying a new car and you trade in your old used car. Well, I knew enough about the vendors to be able to do some of that, so where before they had just two stations everybody had to work from, I set them up so that we could handle classes of anywhere from eight to twelve students at a crack, which was much better. Also, we did the darkroom so that—brought that up to date. Stuff that I knew from having done all this before, of course. So we wound up with the ability to do much better teaching of x-ray diffraction than had been the case heretofore. So, that I think was a real contribution to the teaching of the department.

And of course the quality of the lectures was better because after all, I had a Ph.D. in crystallography, whereas the previous guy who had done it was kind of a jack of all trades, and okay, handy, but not really knowledgeable in the field.

So teaching E45 and the x-ray course, those were my major duties. Not too long after that we also set up a graduate-level quick survey course, students coming in to the department from—they could come from mechanical engineering, civil engineering,

electrical engineering, but wanted to now specialize in materials science, having got an undergraduate degree in something else, but technical. Needed to get a background in overall what materials science is like before they began to take graduate-level courses. So we introduced a kind of a survey, two-semester series along [with] which we put in a laboratory. So I developed a laboratory a little bit more sophisticated than the undergraduate one to go with that. So I did that pretty much until I retired. If not that long, almost that long.

That was the situation early on. And one other thing happened, and that was when I arrived there, there was one faculty member who wasn't there. He was on leave on some kind of a UN project with the IIT, the Indian Institutes of Technology. He had been helpful in setting up the materials sciences courses that got taught in these institutes. His name was Marshall Meriam. He loved that kind of international stuff he was doing. And I'd have to say that the IIT graduates were all good. If you got an Indian student coming in from one of the IITs, you could bet your bottom dollar if he had a good record there, he'd make a good record here. So they made great graduate students.

But the point is that Meriam wasn't there. A course that he had formerly taught on electrical properties of materials wasn't being taught. Well, with my background in solid state physics, I could teach that course. So I wound up teaching that course. And that was quite a chore because there didn't exist any really good textbook for that level. You had to either be doing electrical engineering or physics, but materials science is kind of a mish mash. And so the problem of making that palatable and beneficial was something that I spent a lot of time on, I might add.

Wilmot: How did you address a problem like that when there's no literature or teaching tools for an area that you need to teach?

Bragg: Well, you have to borrow from here and there, and you have to decide what's important, what should they know. And if it isn't in one book, which is usually the case, you either have no book and have a set of notes that you work from, or a book which does almost all of that, and you require that book, and then augment that book. I eventually found a book that came pretty close, that's probably still being used. But I don't think anybody ever wrote the perfect one, in my opinion, for materials science, and the electrical and magnetic properties of materials.

At any rate, those were the courses that I at one time or another would teach. And did that pretty well, I would say. The help I got was—initially I took over the course from Earl Parker who had done this course ad infinitum, practically. He was helpful in pointing out things to emphasize. He had a much better feeling for what the students—the level to pitch the course than I would have had, and I had. So he was very helpful in that respect.

Marshall Meriam eventually did come back. It was some three-year stint that they did in setting up these IITs. In the meantime I had inherited his—and I'm not sure why that came about, but the lab space that he had in the Lawrence Berkeley Laboratory became my property. I planned to do similar kinds of experiments that he had been doing. So I had a technician—oh, I might add that, if I didn't make this clear, when I was hired I actually wound up being hired in two places. One is the faculty of the department of Materials Science [and Engineering] at Berkeley, and the other was as a principal

investigator for the Lawrence Berkeley Laboratories. So it gave me two hats, two payrolls. One paid my regular year's salary. The other one, the Lawrence Berkeley Laboratory, paid for my graduate students; they had enough money to pay graduate students, and a summer salary for myself. Graduate students and a technician, and a little secretarial help.

So I was very lucky, I fell into—you know, it's like it put me in the briar patch, I came up with everything in my favor, you might say. Didn't have to sweat writing a lot of proposals to get startup money and so on. So in that respect, coming in, I was very, very fortunate.

The teaching, on the whole I didn't turn out to be as good a teacher as I would like to have been.

Wilmot: What do you mean?

Bragg: Judging by the student evaluations. The good part is I found that I got evaluations from "great" to "awful," and what that told me was that, well, maybe some of the problem is with the students and not me. The other thing was, I think usually when I taught a course for the first time, I got better evaluations that time than subsequent times. And I guess what that meant was as I learned more, I assumed the students knew more, and so I started at the wrong place, later. [laughs] On the whole, I would say I was a good one-on-one teacher, not an outstanding one from the podium. I thought I was doing okay, but I really don't think that I was that good. But most of the students would tell you Bragg was great one-on-one. I think they would. I got that comment many times.

Wilmot: I have a question, coming from industry into the academic environment, how was it different to build camaraderie with your colleagues?

Bragg: Very different, in that in the university, what you have is a kind of an intellectual zoo. The umbrella name is materials science, let's say. But within that, for example, we had Earl Parker and Vic Zackay who were doing work on steels. They virtually never did anything else but work on steels. Zackay had been a researcher at the Ford Research Lab in Detroit and Earl Parker had been several places. But they worked primarily on steels. And they were kind of foundry type—not terribly sophisticated, but very strong applied. John Dorn, who was still there when I first joined, on the other hand, was basically a basic research type, very theoretical. What was interesting about him was he was trained as a physical chemist and hadn't learned anything about mechanical properties of materials when he was in college. Coming in with a Ph.D. and absolutely no background in mechanical properties of materials, he became a world-renowned expert in mechanical properties of materials. In fact there is a prize that is given, a Dorn prize named after—he was my neighbor next door, a nice guy.

Wilmot: To your office?

Bragg: Office, yes. But the point is that—but we had people working on steels, Dorn worked on alloys like mainly aluminum alloys, but other materials as well. He even had done some work on mechanical properties of inorganic materials like cement. Then there was Ralph Hultgren, who worked on thermodynamics mainly as applied to metal systems. Jack Washburn, who had done a lot of work on the mechanical properties of materials,

but also on electron microscopy. Gareth Thomas, who worked on just about anything. And there were two or three guys (Joseph Pask, Richard Fulbrath, Alan Searcy) working in ceramics. And I'm not talking about making toilet bowls, we're talking what they consider to be fine ceramics, like—well—basic properties, of course, not making parts. But the background one needed in order to make sound parts.

So the point is that every one of these is a different, in a way kind of a different sub-discipline. So you can understand what they are saying at some level, but by that time just about everybody would have typically five or six graduate students, some maybe twice that many. So they are already a little self-contained enclave, and so your collegiality is on a rather superficial level in terms of—it's not like the way things had been pre-World War II when faculty wouldn't—you would have experts, of course, but they wouldn't have a lot of graduate students. And when they would go to lunch they would talk to each other about technical things. Whereas the thing that World War II and the National Science Foundation and all that had brought on was lots of money poured into science and engineering. So it was nothing for a faculty member at Berkeley to have six graduate students. In fact, that was more or less our standard load, you might say. So in a way you are a self-contained entity.

I started out working in carbon materials, it was a problem left over from—not problem left over, but a curiosity left over from when I had been at Lockheed. I might have mentioned that out of curiosity one day I took a piece of glassy carbon and hooked it up to an ohmmeter, which measures resistance, and dunked it in some liquid nitrogen. What I expected was the resistance would suddenly go down. Because metals, if you cool them, become better conductors, they don't resist current flow as much. But semiconductors go the other way. When you heat them up, they become more conductive. What I found was glassy carbon became mild, slightly more resistant, which was odd, because it should have been like a semi-metal. It's something I put aside when I was at Lockheed, but now that I had a chance to pick my own research program, I decided to go back to that. That was interesting. Nobody understood that. Nobody even thought about it. It didn't mean that you would not on occasion cross over. For example, I'm an expert in electro x-ray diffraction—in x-ray diffraction. Just about any of those at some time or another might have need for something in x-ray diffraction. But every one of those students should have had my course. So if it was just an ordinary application, they didn't need me. Their student would have the possibility to use my lab facility, but it didn't really need to involve me unless it came to a point of interpretation, where the student wasn't up to it. It might—often would pass through me, but I wasn't involved to that extent.

And I guess I didn't think too deeply at the time, but you have to understand that if you go into a new field which is fairly mature, you're going to work hard as hell to come up with something new. Because all the easy stuff has already been done, and the guys out there are just as smart as you are. So if you're coming into a new field, you can look to have a lot of dry wells before you come up with any kind of oil. [laughs] But if you're into a new phenomenon, you have a possibility of being ahead of the game, or the playing field is a lot more level for you then. So you have a lot more chance of having your talents pay off than if you have to go spend two years catching up to the field. So I'm not sure I thought about it that much. I was just curious and I had the freedom to more or less decide what I wanted to do.

So there was that, and I started some work in eutectic solidification. Eutectic means—it's probably Greek for low melting. What that means is that some materials—and there are lots of them, either artificial or in nature—if you change the chemical composition, some specific compositions, those materials will have a lowest melting point. That is defined as the eutectic temperature. Well, while we were at Lockheed we had some research going on in eutectic solidification, which means freezing of eutectics. And they produced some rather interesting structures that had interesting mechanical and other properties. So I thought that was interesting to take a look at. We did that for a few years until we realized we were never going to catch up with United Technologies or Pratt and Whitney or GE in terms of what we were doing.

But we started some research in that, had one or two students working on solidification. What else? I'll probably think of it. But anyway, those two major directions is where we started out. Oh, another one had to do with the low temperature properties of beryllium metal, which hadn't been really explored very well. Well, and the eutectic solidification, what I chose to do was to look at electrical properties and the thermophysical properties, how they swell or shrink when you heat them and how they conduct heat in different directions. So that we spent some time in. Also, how they harden, how strong they get, by changing the way in which they freeze you can change how hard or how strong they would be. So these were the fields that we looked at, with some graduate students. Those were all in my papers, of course. But at one time I had a German postdoc, Stephan Justi, J-U-S-T-I, he had a Ph.D. already when he joined us, who worked with us for several years on freezing of aluminum copper and aluminum—silicon alloys, and we published some papers on that.

But the basic answer to your question was that the collegiality had to do with rather broad generalities, because everybody has his own castle, or rather his own group, you might say. In fact, I rather didn't like that in that—and here we get down to a philosophical point—in that sometimes the best ideas come up when really thoughtful people, original people are just shooting the breeze. Now, if you don't have time to do that and you're just talking with your graduate students, unless you've got some brilliant graduate students, and sometimes you did—some people got lots of them—I think you suffer from not having input from other colleagues who see the problem that you're talking about from a different light. That always helps to legitimize things. Because if you said it's this and he says it's that, those are things that have got to be both true, otherwise you don't have an accurate picture.

I'm digressing here, but one of the things I wanted to do when I went to Africa, to work with the physics department at the University of Ife in Nigeria, was to try my hand at something that had occurred to me a long time back. What I had seen was that the faculty of that department had very good people in it, that is to say had very good post-graduate education. There wasn't one from an inferior or a low-ranked university in the crowd. They all had gone to places like Cambridge or Oxford or King's College, or in this country, NYU—they had good Ph.D.s!—Stanford. So it wasn't that they hadn't had good training. But there were two things that went wrong with the next step, and that was they usually came home without really having practiced at science. After you get your Ph.D, you're really just a rookie. The typical Ph.D. is smart, but he's still just a rookie. And you need some seasoning. Believe me. That experience makes all the difference in the world in how useful that person can be. At least right off the bat.

At any rate, what I noticed was that a guy would go and get his Ph.D. at Cambridge, and he's pretty good when he leaves there. He comes back to Nigeria and he wants to do exactly what he used to be doing in Cambridge. Well, in Cambridge they had probably half a million, a million dollars worth of equipment, and a tradition of working in that field for years. There's an infrastructure that's available to make you effective and to move on to the next step. But if you come back home and there doesn't exist anything like that, and also you don't have graduate students who are up to that level, then first of all you're not likely to even get the money for the equipment, but even if you do, you can't teach all those courses you have to teach and still run things. So the chances of getting anything useful or anything significant done once you come in after that kind of environment are very, very slim. So it's not too surprising that faculties of African universities don't produce very much in the way of good science. The conditions just aren't conducive to that.

But I thought now, there used to be a time in this country when people didn't have a lot of graduate students, but some very good, fundamental work got done. The professor might be lucky to get one graduate student, and might go for some time without any. But they talked to each other, and they would go to the faculty club at lunchtime and talk, and each one would discuss where he was and so on. And very often they combined in a way which would be synergistic. That is, the whole was greater than the sum of the parts. You understand what I'm getting at.

So I thought, "Well, now what this department really needs," wise person that I am, "is to try to sell a few people on working on one problem, different aspects of the same problem, not different problems which have no connection." And that way you've got a tremendous amount of intellectual muscle to put to bear on it. Everyone has to initially have—the picture that you come up with has to be cohesive. So if something is out of whack, that tells you something right away. Not only that, you may discover that you need to do a certain kind of experiment, but if you don't have the manpower to do that, it won't get done. But Professor So-and-so might be an expert in that. So somehow if you can get people to collaborate and join forces around one or two central problems, even though they might be weak in terms of size and all that, they can still do very significant work.

Wilmot: But that doesn't happen.

Bragg: It doesn't happen. And what I've found is that I've tried to sell—naturally I felt that what I was doing was great. [laughs] And I could think, you know, if I had these guys answering to me, I put him on this part, him on that part, this thing would really tick. But [laughs] it never did come to pass. Well, I'm not sure if it failed outright, because they were on strike most of the time I was there. But I have a feeling I would have to be around a long time before I would get that to happen.

But you raised the question about collegiality, and I think I've sort of touched on that. If I didn't answer your question, well, why don't you come back at me again. Did I go too far off?

Wilmot: No, you answered the question. In some ways the environment you described sounds a little stultifying and stagnant, and I'm wondering if that was the case?

Bragg: No, no, not true. The thing is if you've got half a dozen graduate students and if only three of them are good, you've got results coming along all the time so that there is a constant foment. You don't get that kind of stimulation from your colleagues, you get it from the colleagues in the broader community of scholars. I like that expression community of scholars. But you see what I mean, that you may be doing this; Dave Fischbach is working on something like this at the University of Washington, and he understands what I'm doing and I understand what he's doing. We're doing different things, but the minute he tells me something, I can appreciate what he's doing, and we can just go back and forth like that. And there's another guy at Penn State who's doing some other stuff that is related, and we all get to know each other. So that's where your appreciation and your recognition and your stimulation is coming from, not from your immediate colleagues on the campus. Because everybody's gotten so big that they don't really talk to each other.

Wilmot: In terms of power dynamics in the department, specifically in terms of how resources were allocated. How did that work?

Bragg: Interesting, and a very good point. Who had said, "Power comes from the mouth of a gun?" Was that Stalin, probably? But anyway, it was not quite true. For our department—of course, rank always has its privileges. Full professors outranked assistant professors or associate professors. Not that you were prohibited from saying anything, but having been around longer, you know more people in positions of authority. So while in principle everybody's word is the same, in practice, when the dean wants to know something, he is more likely to consult a senior faculty member than a junior one. So that's one aspect of the phenomenon of power, just being around long enough and recognized as being competent. You could be around a long time and people don't think much of you, in which case [laughs] you don't have any power. But if you've been reasonably successful, you've taught your courses, you've got your grants and whatnot, got money, you've turned out graduate students and you've served on committees and people have gotten to respect you, then you'll get power that way.

Within the department, power more or less came with the size of your graduate enclave. That gets you to the reality that allocation of space more or less has to do with how many people have to be accommodated. Now, you can go to the extreme, and sometimes that almost did happen. But by and large, if you didn't have many graduate students, you usually didn't need a lot of space. And believe me, if there's anything that's precious to a faculty member, it's courses and space. So the department chair then has to deal with competing demands or requirements for—everybody needs more space no matter what he's got, even if some of it's just full of junk. So somewhere along the line, if he is strong he can just crack a whip and say, "Yes, that's true, but that's junk, now move it out to Richmond and store it, it's not being used." All kinds of sophistries are brought up, "Oh, we need this, we need that." Believe me, you have to go through it a few times to become comfortable with the game that's played.

Wilmot: Why did you smile when I asked you that question?

Bragg: About—?

Wilmot: About power dynamics in the department.

Bragg: Well, because that's always going on, and some of it just comes from a lot of noises, some comes from people who are rich in terms of the total number of graduate students they have. And that only goes so far. In private schools, to some extent you can buy your way out of teaching by bringing in lots of extramural money. The idea being that if you've got enough graduate students for the other people to teach, then you've brought in a lot of money to the university, and therefore you should be relieved from the teaching burden, because after all, you laid a golden egg. Well, that only gets you so far at Berkeley. [laughs] It can't be ignored, but there's a limit to how much power that brings with it.

For one thing, your colleagues really aren't all that bad themselves, usually. So you can't get but so far out of line anyway. Another thing is how you got the money in the first place. There are two or three kinds of money you could get. One would be private industry money, that was rare. You might have a consulting gig, you were allowed to consult one day a week. The presumption was that you could manage to teach a course and do your job and still take off a day a week to consult. And the reasons for that being acceptable is that it's considered that your consulting is in the public interest. Of course it's in your own interest too, your pocket. But it's felt that somehow this impacts on society, and so if you don't overdo it, it's beneficial.

But private money essentially would just come through consulting. Some people had regular consulting gigs every week, and some once in a while. Then there was money from the Lawrence Berkeley Lab. Most of us were both faculty members and principal investigators. So we had two hats. We got money from the Lawrence Berkeley Lab, never the same amounts, but amounts depending upon what somebody in the hierarchy there and somebody in Washington thought we ought to have. If your work was kind of hot, and you're cranking out the papers and all that, then you got a more sympathetic response to what you wanted than if your field was considered to be backwater, and wonder "Why are we doing this?"

So, the money came in a block grant from—the divisions of the Lawrence Berkeley Lab would prepare these proposals every year, typically looking two years ahead. You had to report what you have been doing, including what you've done with the money you had already, what you want to do and what it takes in the way of money for equipment, students, and whatnot. So depending upon how successful you were seen to have been, and I emphasize that "seen to have been," that impacted on your money and indirectly then on your power, because again, if you've got more students, you were seen to have done more for everybody.

And there's another source, and that was you could very well instead of just working on money from the Department of Energy, which we did, you might have some money from the National Science Foundation, the Naval Research Lab, any government agency. If things were tight, then of course you're lucky to have one source. If things were booming or you happened to be out in front of everybody—every government agency has to look as though good things are happening with the money that they award. So they want somebody who is going to crank out papers. So a guy who is prolific that way and in a hot field finds that money is much easier to get from many sources than if he is in a backwater field, for example.

But there are all these different sources of money.

Wilmot: Where did your work fall in that continuum?

Bragg: I was near the backwater.

Wilmot: You were near the backwater?

Bragg: Yes. The reason for that was not the quality of the work, not the number of publications or the cost per paper, which was in my case very—well, I got a lot of bang for the buck from my students. But carbon materials, there's a fad that tends to be fast like everything else—clothing, or buzzwords, people, books. Science in a way is no different in that things come up and they look like it's the next big thing to sex, or sliced bread. And at the beginning you don't know whether that's going to be true or not, but it looks interesting, people jump into that field. And often would drop whatever they were doing if they could gracefully get out of it, get over in here because if they're lucky they're going to get the Nobel Prize, or at least a lot of recognition and do something outstanding. So there's a tendency to follow the fad. It's like in a way [laughs]—it's not as catastrophic—but the way the stock market went up way beyond any reasonable expectations for the thing actually paying off, and finally the bubble burst. I'm saying that I think if you would look at the funding patterns of hot things that have come up, a lot of money got put out that probably should not have been put out just because in the early days it looked like, "Well, this is going to be the next best thing, and we want to be the ones that made it happen."

Now, my point then was that in the case of carbon materials, the Department of Energy, which used lots of carbon materials, mind you, in nuclear reactors, for example, in the early days, had felt like, "Well, we've supported just about all the interesting ideas in carbon materials already, so what's new?" And if there is no vehicle, no direct connection to the mission that's pressing, then the tendency is to say, "Well, it's good work and we need some of that, but we don't need all that much." So I never had very big budgets. In a way that was good because I never had that many really outstanding graduate students, might back the tape up and take that off because I don't want—. [laughs] Yes, you had better back up a little bit. Do I get a chance to redline that out?

Wilmot: Yes.

Bragg: Okay, then in that case, then we don't need to bother.

I really should explain, though, that the—well, first of all, when I started out I didn't have a firm, single direction that I planned to follow. I mentioned the eutectic solidification, some work on beryllium metal, and work on glassy carbon. Well, over time, this narrowed down. I cut out stuff that for one reason or another wasn't going to lead anywhere or was uninteresting to me, and concentrated on carbon and even more so on—it gradually led me into the problem that I'm still in a way working on, and that is the kinetics, the mechanism of graphitization, exactly why does it occur? And now the world is, hasn't been waiting around to find out this information. I don't know of any technologies that seem to be poised waiting for this insight to appear. If they were, there would be a lot of people working on it.

[interview interruption]

Bragg: Well, we were talking about basically how you got money to run your programs. And I mentioned that the Department of Energy—since we were principal investigators in the lab, we automatically remained on the payroll. But each investigator had a basic thrust, it more or less defined who he is and what his contribution is to the whole program of the lab. So the lab has a mission, or a set of missions, and that's why the government sees fit to support it, because it's supposed to do something that the government wants. In our case it's research, of course, but in the national interest. That can be very broadly interpreted, or rather loosely.

Wilmot: This is a departure, though, from department funding for graduate students.

Bragg: Yes, the department funds very little. The department puts up money for teaching. There are a few tuition waivers granted so that there's a handful of money that comes out of the state budget for that purpose. But by and large, at least for engineering—and probably because engineering can get money other ways than say, the humanities can't—most of your money came from outside sources, for students. For teaching it's another matter. But at any rate, ultimately, in some way there's a connection between the money you're going to get and the perception somewhere that what you want to do and are doing is in the public interest, sufficiently strong that they should come up with the money for you to do it.

But that ran the national labs and ran lots of individual investigators on various campuses where there wasn't a national lab. For example, it ran the Lawrence Berkeley Lab, the Lawrence Livermore Lab, Sandia in Albuquerque, Los Alamos National Lab, Argonne National Lab, Brookhaven National Lab, and huge programs at the University of Illinois, MIT, and a few other places. And then lots of just individual grants around the country to individual faculty members. Now, I eventually spent a year in the Department of Energy headquarters in Germantown, where all the policy was made and the money was doled out to the best of places. And in that capacity I was there on loan, right after I was department chair for three years. No, I was there on loan for one year. But at any rate, in the division of materials science, out of the Department of Energy budget which would run into billions of dollars, there would be so many hundreds of millions of dollars devoted to materials research. And that now has spread across many, many facilities throughout the country. I think when I was there in '81, probably, our budget was maybe \$100, \$200 million. Now it would be probably ten times that.

The national labs, of course, got funded in big blocks. And of course you have to more or less justify how much of that block you're going to get. The amount to be awarded is decided in the DOE office for the major blocks. But to some extent what happens down below, the allocation within the sub-disciplines in the labs, is a kind of a local matter. So in that job, of course I saw the whole picture of what materials science was all about in the country.

So since we were supporting about one-third of it—and also I served on the advisory committee of the National Science Foundation for the same field, that was another third. Then between things like NASA and the Air Force Office of Scientific Research, those all add up to another—so I pretty much saw the whole picture.

Wilmot: In terms of the kind of research that was happening, or in terms of how people were funded, or just how that bureaucracy worked?

Bragg: We saw where the money went from the other two. How the decision was made, I saw first hand from the DOE, because we—

Wilmot: Would you tell me about that?

Bragg: Yes. It's organized like a branch of the federal government. You have what's called—it would be like a branch chief, and within that you have sub-disciplines. And each one now has his thrust, his or her program. For example, Bob Gottschall, who I got to know very well at the DOE office, his area was ceramics. So within that, his idea of what the country ought to be doing in conformity with the overall DOE mission, what should the country be doing in ceramic materials. So within that confine he not only would have input into what ceramics research went on in the national labs, but also proposals submitted by individual investigators; say some guy at Arkansas might write a proposal that happened to fit exactly what he thought was worth doing, and the guy might get funded.

At any rate, you might ask, “Well, yes, but that's kind of vague. Where is the bible?” Well, I wondered about that too, and not surprisingly, the bible consists of a bunch of prophets.

Wilmot: Well, let's talk about those prophets.

Bragg: [laughs] And the prophets are the pooh-bahs. They're considered to be the guys who are out front there, and know what's good and what's not, and therefore advise the staff on what to support and what not. In the case of the DOE at that time, that advisory committee consisted of a bunch of guys who were powerhouses in their various fields around the country. Every one of them of course got lots of money from the DOE. I'm not sure any of them were outside of the DOE funding, which is kind of like Enron. [laughs] But they'd come together for two or three days a year, and just sort of brainstorm. Everyone comes, of course, prepared to push some topics. But these topics would get discussed, attacked and defended, and out of this would come some set of priorities about—. Well, let's see, right now it looks like nanomaterials are great, nano is hot right now, it's been hot for a few years. Nano means 10^{-9} , and in terms of size that means, well, take a centimeter and divide it into 100 million parts—no, in terms of a billion parts, then you've got a nano of that. So that is as close to the size of an atom, an individual atom. So materials that fine—it turns out often have very interesting properties, some of which may turn out to be very beneficial. And thus have device capability to be made into products that society can use. So nano has been the thrust for the last few years. So “nano” is a good buzzword to put in any proposal that you're going to write. It really adds sex to the whole thing.

Wilmot: Okay, just “nano,” just throw it in there.

Bragg: Yes. Well, it ought to have some connection, but—[laughs]. But you don't want to say it's “small,” you want to say “nano.” [laughs]

I remember the times I was there, there were guys there from MIT, had lots of DOE money, guys there from Illinois who had lots of DOE money. They're almost like as big as national labs, they had so much money. A guy there from Iowa, and a few other

places. But they had all kind of big research programs, turned out a lot of papers. And usually are fairly close to the frontier, that is to say the cutting edge. The presumption is that whatever is evolving, emerging as something important, they would be knowledgeable about it. Not always demonstrably true, but presumed to be true. And so then they say, "This is what's good." The staff itself, they are scientists, but they are no longer doing science. So they have good judgment generally, but they depend upon their vendors, the guys who they give money to, to be the eyes and ears, to referee papers for them, referee proposals and so on.

So as I say, now, the bottom line is that the high priests are these people. They were the big names in whatever field it is we're talking about. They then more or less say what's good. And the staff of the laboratory division more or less agree with them. If they don't, then that would be very strange.

Wilmot: I'm seeing a fairly obvious thread, which is that, in your professional life you're working in these different institutions whose primary client is the military. And I had a question which is, you mentioned that you didn't agree with the Vietnam War. Did that war and your feelings about the war make you reevaluate your feelings about basic research funded by the military?

Bragg: No. For one thing, the research we were doing at the Lawrence Berkeley Laboratory, just about anything you do could have a military application. So if you're going to do that, you can't do research that demonstrably has no military application. So the question is really not that but, are you personally involved in applications which are clearly military? So in that sense, to handle that question some years back, not long after I arrived at the Berkeley campus, at that time it was the Lawrence Radiation Laboratory. It was still called the Lawrence Radiation Laboratory. But there was such a howl about the university involved in war work that the decision was made to split it into two. So now we have a Lawrence Berkeley National Laboratory which does no classified work at all, in other words nothing is secret about it at all, and the Lawrence Livermore National Lab which does a lot of classified work. So that meant then that you didn't have to worry about the security clearance. And unless you went out of your way to get a military contract, your regular work wouldn't involve anything military. Now, the point is that almost anything you want to do can have a military application. So you can't get away from it. You can direct it, but you can't get away from it.

And I'm not sure you should be—you can take a very narrow view about military research, but just about every significant major technological advance we've ever had comes from military applications. You don't have to go to World War II, you can go back to Africa in the Stone Age practically. If you could make weapons out of bronze, whereas the other guy had stone, look at the advantage you have. You can cut people whereas the other guy has to beat you with sticks. The development of steel, which is harder and stronger than bronze or copper. Again, if you see what I'm getting at, if you take a look at it, you daren't stop doing research because there is a military use for it. Even if you personally don't care about military applications, your work can have a military application. So you can't run from that.

Wilmot: I think that's an interesting perspective that you are offering and it does help me because I think that that question may be a little off base.

Bragg: No, it's not off base. It's something that should be confronted, though. It should be raised, but it should be responded to with some understanding. And it's one thing to be at Lockheed, which is funded totally by military practically, but even there to say, you know, "This is too—it's got a military—it might kill somebody." Let's say that you were at Boeing and you worked on 747s, which carry people, fly people from one place to another. Then a bunch of terrorists take a 747 and knocks down the World Trade Center. Do you know what I mean? It's how you use it, it's not whether it's intrinsically warlike or not. So it's a question of, well, how close do you want to be to the firing line? If you're designing the missile that is going to kill somebody, now that is pretty close, and you may not want to do that. But to understand the aerodynamics, which could be used for airplanes as well as missiles, you see—

Wilmot: Since you raised 9/11, I'm going to ask you a question about that before we get back to talking about Lawrence Berkeley Labs. Do you feel like your life changed after that day, after September 11, 2001?

Bragg: Well, yes, and I was in a dentist's chair getting my teeth fixed. [laughs] Only being facetious. But let's say it was a big shock, the degree to which these guys succeeded. Now, they did not expect that to happen. They had no idea that the buildings were going to totally go down. They just thought that that the upper stories would be damaged, kill a lot of people, of course, but not totally destroy those two buildings. They had tried earlier, you know, to do that by putting a bomb under one of the buildings. A few years earlier that had been done. It turned out it wasn't successful, they didn't really weaken the structure enough to cause any damage. So they had probably given up on that, bringing the buildings down by the fact that, well, it looks like that's not going to be easy to do. So I don't think that anybody expected, even the perpetrators themselves, expected the results that they got.

But my sense of whether the world had really changed, it didn't really hit me. You know, once you recognize there is going to be a hysterical response to this, and fear and all that, all the things we are familiar with that went with World War II, for example, people put in concentration camps, and fear of the Japanese coming over dropping bombs, and all that scary stuff that happened, obviously once you think about it, it's going to come back again. But of course I didn't think about that.

Wilmot: You mean hysteria?

Bragg: Yes, the overreaction to dangers that a calmer thinking would recognize, would put in proper perspective. I don't mean you ignore it, but you assess it, and then go ahead from there. But the one thing that I did think about was, it's sort of like the thing that got Malcolm X into trouble with the Prophet Elijah Mohammed when Kennedy got killed and he said, "The chicken has come home to roost." That went through my head because the perpetrators of course were Arabs, and they turned out to be associated with Saudis, indirectly, but—. And you begin to ask questions, well, what's underneath all of this? If you read *1984* or saw the movie, you know that these countries were constantly at war with each other, Oceania and Indasia and I forget the other one.

But you try to find some kind of rationale, why are we in this mess? Why did they do that? And is there any justification, or what is it, or maybe more exactly, what got in their craw that makes them so angry? And the only resolution that I got, or rather only

understanding that I could come up with was an article that I had read not too long after this whole incident occurred, that explained in very simple terms what the issue is all about. And it was just oil. When you got through all the facts, and all the religious stuff and all that, the Arab countries had oil, lots of it, and sooner or later we were likely to run out and have to go them for that oil. Now, not only that, but this was recognized during World War II, that the German army to a large extent failed because they couldn't get enough oil. That wasn't totally true, but I mean, that was a big part of it. The world has gotten so dependant on oil, energy, that makes everything move, that oil, in the foreseeable future, is going to be king. So that meant that somehow we had to get access, guaranteed access to oil. And now we get into deep water for me, because it's not my field. But if I were planning and looking out for the future of my country, and we're going to rule the world, then it seems to me we've got to make damn sure we're going to have plenty of oil for our people.

Now, how are we going to do that? Well, we have to make friends one way or the other or make an alliance with the people who have the oil. So that means get over there and get involved with the Arabs. And in one way or the other, we have the wherewithal to kill them all, but the world won't like that, so that's the kind of recklessness that we can't have, if we suddenly go over and just sort of attack all the Arab countries and settle them, take over their possessions. So short of that, what are we going to do? Well, we get in bed with them. We tell the Saudis that, "We'll protect you from your enemies provided we get dibs on the oil."

Now, I've oversimplified this, and I didn't originate these thoughts, but I remember seeing an editorial, a position piece on this not too long after the 9/11. And it did clarify to me, I don't think I can be far wrong, if you go back and look at Desert Storm. That was fought over oil, just supply of oil, that's all it was. Saddam Hussein is saying, "Well, no, us Arabs are going to run the oil." And we said, "No you don't, we're going to go over there and defend those Kuwaitis," or whoever they were. So it was all over oil. And so if your question is, did my world change, yes, it slightly did. Did my perception change? Yes, to the extent that when you look beneath all the shame, all the rhetoric and the false directions, you ask well, what's underneath all of—why are we over there? Why don't we just forget them? Well, because they've got the oil.

Wilmot: I think "did your perception change" is a very good distinction, thank you.

Bragg: So that's—I haven't seen anything yet that changes that. [laughs]

Wilmot: I wanted to ask you one other kind of war-related question again. With Vietnam occurring, and as I understand, your son was probably in kind of his late teens at that time, and I was wondering if—?

Bragg: How I felt about my son going into the service?

Wilmot: Oh, did he go into service?

Bragg: No, he didn't.

Wilmot: How did that impact your family?

- Bragg: Well, initially I paid no attention to Vietnam. It was just something that was going on, and it wasn't important to me. I was a little bit pissed off when I'd interview students who were out to avoid it, avoid service. And I guess maybe it's from being old-fashioned, I felt, well, you know, I went, and if it's your country, well, you should go. Do something, don't just get off scot-free. So that was my attitude towards Vietnam service. I didn't question the legality or the moral authority for it, I hadn't gotten into that level. When my son came on like a peacenik, that kind of pulled us apart because I felt like, well, you know, it's your turn. Well, it turned out that he discovered there was something, he had a condition which was going to eventually lead to his kidney failing. So the issue was resolved for him, he didn't have to go. Not because he refused, he might have, but he didn't have to because it hit him that way, and eventually his kidney did fail.
- Wilmot: Was he part of a community of folks who were peaceniks? You used the word peacenik.
- Bragg: I just used that because it was the way young people at that time were called, that age were. I don't know the details because I wasn't involved in this, but I felt that there were a lot of rallies, movements and whatnot against the Vietnam War, which turned out to be basically right, that the conservative press and old people like me, and those veterans for example, felt that, "it's a bunch of slackers." So, it took a while for the whole thing to come out and to eventually see the gross error of our ways. And exactly why we were over there I'm still not quite sure, but if you look closely, like Deep Throat, I'm sure, if you follow the money you'll find that there was oil or something like that, that's why we were over there. Certainly not just because we wanted to protect the Vietnamese.
- Wilmot: So I guess the question I'm trying to ask is about, during that time in the late sixties and seventies there was so much going on in our society in terms of just social change. And it was really spearheaded by young people and I'm wondering to what extent—again, I know your son was actually quite young at that time. He wasn't quite an adult—
- Bragg: Well, he was born in '51, so you can—
- Wilmot: Twenty-something. So to what extent did that enter into your life through your children?
- Bragg: Not at all. By '66, I'm separated from my ex-wife. And we were divorced by 1970. For about four years, we just separated. And that kind of poisoned everything because I was—well, her take was that I was a deserter, and mine was that we were incompatible. And of course—not of course, but the children remained with her, and the house and everything we had. So it took a while, long after that divorce, I might add, was final, before my children and I were back on good terms with each other. It was not good; it was not nice.
- Wilmot: Yes. When you came to Berkeley then, did you—
- Bragg: My divorce had just become final when I—no, it became final in 1970, so as late as 1969 I still was just separated.
- Wilmot: How soon did you set up a home over here in the East Bay as opposed to commuting from Stanford?

Bragg: I don't know, but it didn't take long. I found an apartment on College Avenue, and a very nice place, which I kept I guess maybe a year, maybe a year or two. And interesting incident happened, I think, while I was still there on College Avenue. Patty Hearst was abducted about two blocks away from where [laughs] I was living at the time. No connection, [laughs] it just happened that geographically that's where I was living.

The estrangement was rough because we had been married since 1947, and the separation came in 1966, it had been nineteen years, you see. So I was kind of at loose ends—not kind of, quite a bit at loose ends in that private life. It showed up in what could have been a very serious problem of alcoholism. I drank too much, not just once but many times. I realized that that wasn't good, but it took a while to come to grips with it. In fact, when I first joined the faculty I was drinking too much. And that doesn't go unnoticed, naturally. It finally came to a head when I had one very serious episode of being unable to come to work. My family physician and friend, who had previously put me through a detoxification program at Stanford Hospital, said, "This time, look, I can patch you up again, but you've really got to do something." And of course it wasn't new, I knew I had to, as well. Fuerstenau had spoken to me, "Look, Pete, you've got to do something." I might have mentioned that earlier about the white psychiatrist who was amazed that I—did I mention that?

Wilmot: At one point when we were off tape, yes.

Bragg: Yes. Well, it wasn't that I made no attempt to do anything about it. But as I say, I didn't tell you but he had recommended a psychiatrist who had been helpful to some friend of his, a white guy in Berkeley. I went to see him several times, but it seemed to me we spent so much time, practically all the time his being just amazed that I had managed to get where I was, not the drinking but just do that, period. Forget about the drinking, just—well, he had never run into a black with my kind of a background. Well, I felt, well, this is good but I'm paying him to educate him, [laughs] so I cut that out.

But as I said, I finally had an episode—also, for a short time, I went once or twice to see William Grier. Now, Grier was—at one time two black psychiatrists wrote a book called *Black Rage*, Cobbs and Grier. Well, Grier was the guy I went to see, a wonderful guy, he was very pragmatic, his advice, had I been able to follow it right off, would have been perfect. But of course, it didn't take right away, but not, again, for a lack of getting good counseling.

Wilmot: What was his advice, what was his advice?

Bragg: Stop drinking. [laughter]

Wilmot: Okay. [laughter]

Bragg: And also, redirect my efforts, which would automatically happen if you stopped drinking, to essentially turn around the perception that must have been developing, it was, about who you are and where you're going. I don't remember exactly what it was, but I remember he went about it in a very practical way, not "Get on the couch and tell me why your mother didn't like you." [laughs] That never happened.

My aunt Edna died sometime after, I guess, about the time that I came to Berkeley. My uncle Teddy, who had been my guardian in Chicago when I first came to Chicago, and I went through high school and all that, and his wife Edna Mae—they had gotten old and he had had several strokes and no longer was working—they had fallen on hard times, and I brought them out to Berkeley. For a time they lived with me, actually, in a kind of crowded apartment. I found another place for them to live, and she passed. I really loved her, and that just kind of set me off. I'm not sure that—that's certainly not the whole story, but it was the straw that broke the camel's back, and I wound up on a binge. A friend who had been after me for months to—you know, putting literature around saying, "Here's what you can do," and all that, took me to the hospital, to a program that she had found in San Francisco, a rehabilitation program, in connection, in concert, in conjunction with my physician, who didn't have the background, in looking around—she was a nurse—agreed, "Yes, this is a good place."

So after they sort of thawed me out, or more likely dried me out, I just went directly from the Stanford Hospital to the program which is in a—the hospital is called the Garden Sullivan on Geary Street in San Francisco. The best three weeks I ever spent in anything, because—a very short program, mind you, that's not a long time. But first of all, the downside was that that suddenly left my courses uncovered, and Fuerstenau told me, "Look, stay where you are, we'll cover your courses for you." So that worked out fine.

Wilmot: They gave support, then.

Bragg: What it meant was that even though they were probably pissed off at me, that's where the collegiality comes in. The department has to cover the courses. So it's not a matter of volunteering, it's a matter of, "Well, we've got to do this. He's one of us, and right now we don't like him for what he's done, but we've got to cover these courses." So that was handled like, "Don't worry about that, get well."

The upside, of course, was that whatever might have been the underlying explanation, the fact is that phone calls with problems to be solved were cut off. In other words, I was essentially—it was like a time out, and none of that stuff was involved. And, a lot of education about the abuse of anything, and I found out that there are all kinds of people who abuse all kinds of things, liquor, drugs, but there are workaholics, there are foodaholics, you name anything that you do, you can be -aholic at it. And they all have certain similar characteristics. In the case of the alcoholics, what I found was, what we were taught, and I believe it's true, that they tend to be thoughtful people on the whole, quite often intelligent, very often intelligent. Typically all things to all people, that is, given any kind of question, they feel like they ought to respond and—they can't say no, in other words, to what seems like a reasonable request if they can do it, so they tend to be overworked. And, let's see, the rules are don't get too tired, don't get too lonesome, learn to say no, don't put yourself in clearly conditions that are conducive to backsliding or to essentially going backwards.

But above all, or rather at the very outset, they found out that an alcoholic, or any kind of -aholic—in the case of alcohol, it's a person that having taken a drink can't stop, doesn't seem to be able to stop at some point where clearly more is going to be disastrous. And you're an alcoholic no matter what your limit is. It could be very trivial, and it varies enormously. But if doing this gets in the way of what you want to do, then

you've got a problem, you've got an alcoholic problem. So that was very important, very useful for a person who comes in with traditional notions about an alcoholic is a bum out there in the gutter, or a person who has lost everything. So there are all kinds of levels of alcoholism, and most people had to go through some kind of a deterioration or bottom before they came out of it. Now, sometimes they never hit that bottom; they've died before they got it. And others had a very shallow bottom, you never even saw it. But there were certain common things about it that you learned in lots of lectures and all that, which is very beneficial for someone on that mental plane.

In three weeks' time, it took a while to—even though you presumably had dried out in a matter of a few days, the fact is your system has got a lot of poisons in it that you can feel them coming out over a period of weeks, actually. But eventually I came out. At first I was afraid that I'd walk by a liquor store, I might have an urge to go in and get some liquor [laughs]. But with help from my friend and rap groups, I don't mean music, I mean discussion—

Wilmot: I know.

Bragg: [laughs] Discussion groups, not rap groups, which were held there at the hospital, we would go and—it was very useful. The outpatient things where people have common problems or discussions are very useful because they help you to air out things, also to see the lack of uniqueness about it; just about everything you've come across, somebody else has had it too. Those worked out very well. I did that for weeks, going to discussion groups every week. And gradually that kind of faded away, and after a while you look up one day and you just, it's all gone, you don't need it anymore. But it helped, it was very helpful at the outset.

Wilmot: What year was that?

Bragg: That was probably 1970.

Wilmot: Wow, just after you got to Berkeley, right then.

Bragg: Not too long, because, you see, I was having—some of those problems were there when I arrived at Berkeley, but they then flared up and really got out of hand. I'm not sure if the job, if the stress, if some of that is job-related stress or not. Suffice it to say I never felt the need to go back and, "Why, why, why, why, why?" In that sense I'm more of a pragmatist. They had said, when I went into the program, "Look, if that's what you want, do it after you leave here, but right now, you drink too much. So let's stop that and get ahold of that, and then it's up to you if you want to do the other." And after I got out of it I finally realized, well, you do in the end have to come to grips with it, get ahold of it. If you can't handle it, don't do it. And if you are going to dinner parties where this is wine glasses on the table, just turn yours down. You don't have to explain a damn thing. You don't have to say, "Yes, I don't do this because—" There are all kinds of fears that you are going to be exposed, and there is a big sign on you that's not visible to you but to everybody else that says "Alcoholic" on your back. None of that is true, of course.

But at first, of course, people who have had some prior knowledge about what you've been through naturally are concerned whether you're going to do this again. So for a while there you really are under the gun. But I'd have to say that, this occurred like in

1972 or thereabouts. By '78 I was department chairman. That was hardly going to happen if there is an institutional memory that says, "This guy is out." So I'm very fortunate that I not only was able to come out of it, but come out of it with a positive slope and good things just happened. I'm not sure how did we get on that?

Wilmot: I asked a question about your son and his involvement in any of the social upheaval that was happening at that time in protesting, and also—actually, I guess the word that people use is counterculture, and I was asking about that. And then you were telling me a little bit about your separation from your wife, and—

Bragg: The counterculture, I would say that if there was such, Bobb would be on that side. He is hardly a traditionalist. At school, although he scored in the 98th percentile or something like that on these tests that I think they were giving at the sophomore level, he didn't really care much. And by the time he is at this level, I am out of the home. I'm not there pushing him, and I never did, actually. But apparently nobody did, so he had a very indifferent undergraduate record. Went to Foothill [College]. And again, why, I don't know, but there were the jocks, and the eggheads, and the cool dudes, and he [laughs] got himself into, hooked up with the cool dudes, who were kind of scruffy, you know, deliberately scruffy and all that, the kind of thing that sends parents up the wall. And that was the way he went into things.

As a consequences, it took him a while to get refocused. But if it came to counterculture, I'd say that he wasn't out throwing bombs or doing stuff like that, he just—if it was traditional, the chances are he was on the other side of it. [chuckles]

Wilmot: Okay, yes, and the word counterculture, it's one of those words that I'm not sure is good when it comes to describing people's lived experience. But in any event, thank you for responding to that question.

Bragg: Yes, right.

Wilmot: We have about four minutes left on this tape, so I wanted to just go back to Berkeley, and I had a question about Lawrence Livermore Lab, and I'm not sure how far we can get with that today.

Bragg: Well, we won't get very far, because I don't know anything about Lawrence Livermore Lab.

Wilmot: Sorry, [laughs] Lawrence Berkeley Lab. You know, when you're not moving in that world, it's hard to keep the two separate, I apologize for that. That was just a slip.

Bragg: Yes, okay. No problem.

Wilmot: But I think that, what I wanted to ask you is what was your experience like there?

Bragg: At Lawrence Berkeley Lab?

Wilmot: Yes.

Bragg: It was good. I had an office—well, I was kind of a novelty because I was black, and nobody said, “You’re a novelty,” but I knew it.

Wilmot: Well, that must have been a new experience for you.

Bragg: Well, not for me. But for them!

Wilmot: [laughter]

Bragg: It was for them. The staff, the part of the lab that I saw, that I was involved in was the materials sciences division of the laboratory, Building Sixty-Two I think it was, of the whole hundreds of buildings they had up there. When I went there, of course, the professionals ran the thing, had the authority, but the day-to-day stuff was staff. And these are all people who have been around there a long time, and not that glad to see me come. Nobody said—would go out of their way to create problems, but the kind of congenial response to problems I got was not what I would have expected. And I can’t be too specific because it’s just an impression. But certainly administrative things, not so much things in terms of technical, like with the technicians and so on, they were okay, but people who had something to do with stuff in the office, pushing pieces of paper. I got the impression that it would have been much nicer if I had never been there. But that changed with people too. Some of the people who had that attitude retired, and were replaced by others who didn’t have it. So it’s an iffy kind of, touch and go kind of situation.

In terms of the response that I got to my requests that had to do with getting things done and so on, I just got in the queue. And of course if you’re the last guy there you don’t know the game, and there is such a thing as—well, if you know the infrastructure well enough, things can move pretty fast for you in getting things done. If you don’t, they can take forever. Another version of that is scrounging. Some people can find things that don’t appear to be available, and others think they can just write out a requisition, send it into the office, and somebody goes and signs it. But there are ways to work the system, and if you come in late and are not favored particularly, then of course you have to learn the hard way. You had best try to hook up with somebody who understands the game who schools you or your technicians on getting things done. Otherwise you can wind up spending a lot of money and a lot of time and nothing really good is happening.

So I saw some of that. As far as the response to what I was doing, as I said, basically it was, you might say, live and let live. The work on carbon materials, we spent a lot of material on carbon materials ten or so years ago. And as I mentioned in talking with the priests, the high priests and all that, high priests don’t see anything particularly important about some more research in carbon materials. So I have essentially a grace period where I can do pretty much what I please, but in time it’s going to be turning out that, well, “Why are you still doing that?” So you have freedom but you don’t. So my relationship there was when I began to get publications, I never wound up with a lot of incrementally bigger budgets, but my budgets stayed pretty much level until I went off to the DOE headquarters. So I enjoyed a good fifteen years practically of reasonably constant support, nothing exotic. And we managed to publish quite a few papers. Certainly the number of papers per dollar was very high.

I don't have any real complaints about how I was treated. I wound up on lab committees that had to do with affirmative action. These are things that didn't happen to everybody, but that happened to me because I'm black, and there aren't that many black people around the Lawrence Berkeley Laboratory, doing anything for that matter.

Experiments that were done early on—I remember one where somebody got the idea that we ought to be encouraging young high school students to get involved in science, which is sort of what the MESA program is like. So I got involved with that, not through the lab but through the campus. But one time, we had a program where we had budget to bring in high school students to work with our groups just to get them in touch with the work, hopefully to turn them on because of what they would be doing. And it was voluntary, of course, but naturally I participated in it. I wound up with a young fellow, I don't remember his last name, his name was Kenny.

Kenny was a student at Berkeley High. His father was a longshoreman and his mother was a domestic. Bright, not brilliant but bright. And I put him to work with Tom Mowles, who was my chief technician, M-O-W-L-E-S. Tom was a very sensitized kind of guy, probably almost counterculture himself. [laughs] But we did things like buying them little kits to make a radio which he could assemble and it would play, and that's a great feeling, once you do that, to have it actually play. And we had work going on involving, dealing with liquid hydrogen, liquid helium, he was learning how to handle that, just a tremendous experience. And he was doing fine.

Then Kenny began to goof off, falsify his attendance records, everybody would turn in their own attendance records, from which they would get paid. But after a while if you don't see him around and the hours are still there, you wonder what's happening. He's obviously falsifying. And it turned out that peer pressure was just too much. The kind of peers that he had, there was no way he could get any excitement out of them about working with liquid helium. So in the end that program, which was well intentioned, and maybe if we stayed with it longer we would have gotten some results, did not. I didn't have a chance to work with him personally much, but the group was very congenial with him.

Wilmot: Very connected with him.

Bragg: Yes, but I think the peer pressure was just too much. Well, are we done, or keep going?

Wilmot: I was thinking we could keep going, but it depends on how you feel?

Bragg: No, let's stop—

Wilmot: Okay, I'm going to stop then for the day. Okay, is there anything else to say about Kenny, or that was the story?

Bragg: No, no, it was—he just—it was putting him at odds with his mates, meaning his buddies.

Wilmot: Okay, we'll end for today.

Interview 12: July 30, 2002

Wilmot: Today is July 30th, and it's interview number twelve with Professor Robert H. Bragg.

Bragg: Right.

Wilmot: Okay, so let's see, we were going to start off today with just going back to your reception in the department after you returned from getting better.

Bragg: Right. I might have given the impression earlier that all was sweetness and light, and while it's true that my colleagues were very supportive, nobody threw off on me, I didn't get dirty looks, that sort of thing, I was not without some—the department chair, Fuerstenau, who had urged me to get help, still gave me KP more or less for a while after I came back. KP meaning scut work that normally a full professor wouldn't do. Part of that was because the episode occurred probably midway between—at some point where it was—once another person had taken over my load, it made no sense to be switching back. I'm not sure of that, but at any rate, things like supervising laboratory sessions for E45, which I had never done before. Or handling a course that normally an associate professor would do, taking students on field trips. Well, some of that turned out to be beneficial, actually [laughs], although it was KP. For example, it compelled me to get around to taking students to places like the Kaiser Center for Technology out in Pleasanton, the steel mills, where I had never been myself, and a number of places like that. And of course I did some other things like bring them down to Silicon Valley, which hadn't been done previously. So on the balance, I would say the scut work, I never did really feel that I suffered from that.

I think I taught one course on mineral processing that I didn't know a thing about, and that compelled me, again, to become even broader, which probably didn't hurt either. So it was meant not to be nice to me, not to reward me, it was to more or less—well, I'm not sure the word would be punish, but it was considered to be, most of that was considered to be scut work. But I survived it and went back finally to my regular teaching rounds.

And things sort of went along pretty good after that until the time to change chairs. The normal period at Berkeley for chairs is three to five years. For deans, five to seven years, and provosts and whatnot, not much different from—probably ten years is a long time around Berkeley, not too many current chancellors or provosts serve longer than that. At any rate, Fuerstenau had stayed longer than his five years, because he was trying to build up the mineral engineering part of the department. Understand that at one time in the state of California there used to be a School of Mines at Berkeley, like a college, a School of Mines, which occupied that whole Hearst Mining Building. They might have 500 guys there learning to be miners, or somehow associated with the mine industry, because of the gold mining, and after that silver, after gold went out, silver. And in general, mining engineering was big. Well, as time went on and the Gold Rush sort of ended, things petered down, other things came in and the engineering became a school, and mining then became a department.

But Fuerstenau, who had been trained in mineral processing and was more associated with mining than physical metallurgy, wanted to build up that side of the department.

His idea was that the department should be the only of its kind in the country which went all the way from finding the ores to be made into useful metals, all the way to the most exotic and highly refined, high technology metals that commerce—. And from there you took it to manufacturing of parts. So it was like cradle to the grave. It was a unique concept, and that was Fuerstenau's—I guess that was why he was allowed to stay on as long as he did, because the department did have mining engineers, some from South Africa, it turns out, the best ones come from there because there is so much mining still there. We had mineral processing, we had ceramicists, we had metallurgists, and we had people who were sort of very broad and they were material scientists. So he had actually managed to do all that.

At that point, his time came up, that was probably '78. At this point, when the departments change—understand at Berkeley, typically you don't have department heads, you have department chairs. I used to wonder why that is different. You go to a place like Northwestern or a place like, say, Illinois, and the department chair will just go on forever. But at Berkeley that doesn't happen, at least over in the School of Engineering it doesn't happen. The reason is, I finally understood why that's the case in some places and not in others—if you have a strong faculty, you don't need anybody prodding people, what you need is somebody keeping peace. You need a person who is strong enough to stand up to all of them, but at the same time you don't need him to be motivating them to do better. If anything, everyone thinks that everybody should be doing what he is doing. So you don't have a lot of dead wood around. You've got too many live wires, if anything. So therefore, to keep anybody from becoming a despot or a tyrant, you change.

So being a chair is not an honor in a sense, it's just a duty. On the outside people think it's a big deal, but basically what you do is to referee fights, [laughs] figuratively. And it turns out when you look at the faculty handbook, which I finally got after I became chair, [laughs] you assign teaching and space, and after that it's all more or less what you make out of it. There are other things you do too, but any rate what the dean does is—Yes?

Wilmot: When you say referee fights, those are over resources like space and then teaching, is that—?

Bragg: Or they could be just little disputes, for example, I'm thinking of students who—. Once a student commits to a graduate advisor, in principle he is not obliged to stay with that person. He might find that they don't get along. But if the student is a good student, the department doesn't want to lose him just because he can't get along with Professor So-and-so. So the problem is, how are you going to segue this person into another situation without Professor So-and-so losing face and so on. So there are delicate little personal things like that that come up, and there's nothing in the book that tells you how to handle that. You just have some sense of how to deal with people.

Wilmot: Have to have some grace.

Bragg: Yes. So what the dean does is to circulate confidential letters to all the faculty saying it's time to replace the existing one. "We'd like to have your nomination of anyone or several, and the reasons why." And at that particular time it turned out that because of the three basic areas in the department—we're talking about, let's see, mineral

engineering, which is what Doug Fuerstenau came from, metallurgy and ceramics, which Jack Washburn, the previous one, had come from; and the new mining, which had very few people in it. Mineral engineering had just had its turn, Jack Washburn had been the previous one, he was on the metallurgy side, and so ordinarily it would have been the turn of the third component, but they are new and small in number.

It turned out that in terms of seniority, I'm talking about being a full professor, knowing the department, its offerings and so on, there were—Earl Parker, one of my sponsors had already been a chairman, he didn't want to be chairman again. Victor Zackay, his right hand, they were colleagues, they worked together in sponsoring graduate students and so on, would have been a good choice. He had administrative experience from industry, had worked at Ford, in the research lab in Detroit, and was a congenial guy. But the impression was that he and Earl Parker in being involved in the Lawrence Berkeley Lab on the hill, and the funding that came into the department through the hill, had somehow not been as evenhanded as they should have been with respect to the distribution of research money to their colleagues, and so there was kind of bad blood. So that would have been a poor choice, Zackay would have been a poor choice. There was one other guy who had the stature, certainly, but he had tons of graduate students and he was constantly traveling. That was Gareth Thomas. Thomas tended to be a little bit autocratic too.

So it turned out the best guy for the job right then was me, and that's what I said, pretty much gave both reasons, pointed out that in terms of scope I was the only real materials scientist in the whole department, because I had done stuff related to minerals, clay minerals, cement, I could relate to concrete, I could relate to metals because I had been at Lockheed, electronic materials at IIT Research Institute. And besides, I had been a manager. So I had all the prerequisites. I didn't call attention to the alcoholism, but I didn't need to, because they already knew that. [laughs] And besides, it didn't have anything to do with it. That had long since passed.

So I put it down there. I didn't know what would happen. But not too long after that Doug Fuerstenau came by my office and said, "Hey, you know, you may wind up department chair." [laughs] The same guy who chewed me out not too many years earlier. And sure enough, it came through, and I became the department chair. That was—I guess the academic year begins the first of July, and that would have been '78.

The reaction was interesting. Nobody came with a sour face. Some said congratulations. A few, fearful that I would make draconian changes in the teaching assignments, made a plea for keeping the courses that they wanted. But basically that went down fairly smoothly. The department had an assistant who hadn't been a strong supporter of mine, did not express any hostility, and in fact, eventually I was able to get her a promotion, as I might have mentioned earlier.

Wilmot: You did mention that.

Bragg: That she normally probably couldn't have gotten. So I think one way or the other I finally made her a friend, a real friend.

The first faculty meeting was interesting because that tests what reaction you are going to get, and basically it was cordial. Oddly enough, the biggest noises I got was from a

faculty member who was not even a regular member. There is a title called “in residence,” “professor in residence.” It’s a way of getting people involved in your department on soft money. I forget all the details now, but the professor in residence is fine as long as there is the soft money to keep him there. But that’s one of the privileges that doesn’t go with—he’s not tenured in that sense. But at any rate, they were reasonably congenial. At times it would be contentious anyway, because these sub-factions fighting over—when things get a little bit tight you would always find, “Well, why do we need these guys,” or words to that effect, some of them almost insulting, rude. Not under my watch, necessarily, that happened before. But I rather didn’t like that.

But right away I of course go into teaching assignments, and it turned out that having the ad[ministrative] assist[ant] with all that experience was very good, because she could make out the teaching roster almost without my—better than I did because they more or less repeated themselves.

Wilmot: What was that administrative assistant’s name?

Bragg: Judy Roberts. When it came to getting out routine letters, she knew exactly how to—they weren’t gems, but they served the purpose, form letters for different situations and routine correspondence, she would just compose a letter with my signature. I rarely had occasion to—for routine stuff, some things are just recurring. In fact, it got to the point where she would just confront me with a bunch of blank pieces of paper for me to sign in different places depending upon the length of the letter, so all I would have to do is just see a copy of what had been sent out. So believe me, it makes a hell of a difference having a good, [laughs] a good ad assist. She was really good, so she earned every penny she got.

Without going into details, the gory details, about the only thing that I didn’t do was continue to teach my courses. I kept my graduate students, and I kept active with the BESSA. I brought in new blood, one guy from UCLA, one who I knew. I thought he was a good man, and he taught one semester. Another time I brought in a guy from Oak Ridge who I had never met, but I knew he was good. He enjoyed it and we became very good friends. I think I taught the first time around, the next time I didn’t do it. And I was only chair three years, so that was that. Chair duties like you would go represent the department or something important, either at a society meeting, or in one case one of our colleagues from Stanford was killed in an airline accident, Allen Tettelman. When I was at Lockheed and he was at Stanford, I almost hired him, but later when I am chairing the department he was killed in this accident. So I went down to represent the department. Ceremonial things like that. Dignitaries would come, like people were coming from China, every time you looked around there was a new level of people coming in from the People’s Republic, yes, from mainland China.

One interesting time I remember, I realized that these guys, they’re from China, and they’re going to be getting steak and filet mignon just about everywhere they go. One of these days, after a while, you get tired of all this rich food. They’re going across the country now. So I decide that I’m not even going to do that, we’re going to give them some good old soul food. So I have a friend who was a great cook, and also she has a very nice house with a big dining room. So I ask her if she would do me a favor of cooking the—I could have hired a caterer, of course, but she also is a very nice

conversationalist, she used to be a journalist. So we had these guys over for a soul food dinner, except done with china and linen. We had the juice from mustard greens as kind of a—like for a vegetable lead-off. We had some greens, we had some black-eyed peas, I don't remember the exact menu but probably sweet potato pie or something like that. These guys ate it up! [laughs] They were so happy, said, "This is the food we eat at home! This is the way we eat at home!"

Wilmot: They're from China?

Bragg: Yes. Well, you can imagine, the typical ethnic food is not what you get at a gourmet restaurant, it's what you get down the street next to the alley. That's what people eat, they don't—for example, Mexican food, Mexicans don't eat that stuff we eat all the time. They can't afford it. So it's a lot of beans and stuff, but the rich stuff that we get, even in China—

One time, this is a digression, but we had a former student who had gotten his Ph.D. years ago at Berkeley in physics, had gotten over into metallurgy, materials science and done well in China, and now he has been resurrected, he's allowed to travel. So he's coming back after fifty years, I think his name was Ke, Professor Ke. And he's an old man now. In fact, he was so far behind progress in ethnic relations that he remembered Old Black Joe, he would whistle it, or some song like that that nobody with the sensitivity of that day would have done that, but [laughs] he had been out of touch. But the point is that—

Wilmot: What did he do, did he sing the song?

Bragg: Oh, I've jumped around. As far as the dinner is concerned, we're finished with that. They loved it, and I rather liked that. And in fact a few other times that I saw fit to have a small group over, I would do soul food. Other times when I would have to take people out like for lunch, usually I would go down either to the Yen Ching on Shattuck, which is a Chinese restaurant, or Dock of the Bay, which is a black restaurant out on the Berkeley—going out towards the Berkeley Marina. It's still there, but it's not Dock of the Bay anymore, but at that time they served New Orleans-style food.

The point I was going to make about Professor Ke was that in his case I took him by this same restaurant on Shattuck where I knew the proprietor, told him the sort of person I was bringing. He said, "I know what he wants." And he had something like pig snouts or pig—the nose of the pig, or pig ears, or something. This was stuff that I wouldn't even eat. This guy loved it, he just—it was commonly done where he lived. So I think the notion that we have of everybody eating these meals made for emperors is not true, in my experience. At any rate, being a ceremonial head, I had to do things like that.

Wilmot: I have some questions for you.

Bragg: Speak.

Wilmot: You mentioned how as chair part of your job was to help the department negotiate resource allocation for the three different areas—you mentioned new mining, metallurgy, and ceramics, and mineral engineering—and how the different kind of

factions, if I could use that word, would kind of say, "Hey, we don't need this," or, "I need a lot more of this." I wanted to hear a bit more about how you helped that happen.

Bragg: I'm not sure exactly what I did except that—now, let's see—I'm trying to think of an example that would illustrate what I meant. Well, let's go back even to the business of faculty allocation itself. The department has a certain authorized size from the dean's office. Now, somewhere further up the line, the dean has a total head count allocated to him, which he can then dispose of down below. In other words, he's got several different engineering departments, but as far as the guy up ahead of him is concerned, the guy says engineering gets so many heads. So at each level the guy there is dividing down below. So if we get an extra man in our department, somebody in the College of Engineering is going to be short of one, unless the whole college is going to get some more people. So now the question is, once it has come down to our department, where do we add the new man?

For example, when I first came to the department, the power pretty much was heavily on the side of metallurgy. And people were so much concerned with steel, much more concerned with steel than they were with, say, aluminum, or more importantly, silicon. Because right down fifty miles away is the engine that's going to set the world on fire, Silicon Valley. We didn't have any people in the department at all doing work on electronic materials, which every year, when the chair would write in, he would ask for comments to put into the department plan, I would write a little statement to that effect, "Hey, look, we're right next to Silicon Valley, we should have some activity going on in this area." It would go into the report, and nothing would happen to it! Because steel was running things—even though there was only one, there were two steel mills in the state of California—one was a rolling mill up in Pittsburg, California, that U.S. Steel had, and I think Kaiser had a steelworks in Fontana, down somewhat east of L.A. And I think that eventually went belly-up. So there wasn't a lot of steel—you get good training, but you had to go out of the state to do the kind of things that were being taught. So it seemed to me an allocation of resources in that area that wasn't that important.

So also there's not a lot of mining being done in California either. There used to be, but now that's over in Nevada and Utah and places like that. So we were exporting people. What does a graduate do when he gets his Ph.D., or his undergraduate degree? We can't even get students to take those courses. So the thing that Doug wanted to do really didn't make that much sense in the long run. They were constantly struggling to prove they existed or should exist.

Well, as it happened, just before I became chair of the department, the chancellor's office, or maybe it was the provost, ordered a review of our department. Not just picking on us, there were periodically—so many departments per year would get reviewed. Our turn was up, it hadn't been done in maybe ten, twenty years, and it turned out we had a hell of a lot more courses than we had faculty to teach. We were course-rich and faculty-poor, is what the report said. And one of the criticisms was exactly what I had said, no work going on in electronic materials. So that meant then that the department has to write a response to this report. [laughs] It turned out that one of the review guys who was on the review committee was so critical that one of our guys, this person almost threatened to [laughs] strike him with his fist, it was hardly collegial. The "critical" guy didn't bother to come back, either. [laughs] I won't call any names.

Wilmot: Okay.

Bragg: But anyway. But the point is, the criticism was sound. We had too many courses. We were going off in too many directions. And also, some of it was irrelevant. About every five years courses ought to be looked at and changed anyway, because unless the field is really stagnant, some of your material is becoming obsolete. This would happen in your lectures anyway. But at any rate—

Wilmot: Especially in a field like that that is just so connected to what's going on in industry.

Bragg: Oh, yes.

Wilmot: It makes a lot of sense to me.

Bragg: When it comes to mathematics, Euclid—you could bring in different ways of teaching geometry. But you're going to have to go a long way before you've caught up to where science is today in mathematics. But in engineering it's quite different. Things are always moving, and they don't stand still. And new technology and new ideas come in, later become obsolete, you don't do that any more, so you do have to change.

Well, at any rate we got the authorization to hire. And I'm not sure whether we were told what to hire or not, but one of the first acts that I was involved in that changed the direction of the department was bringing in our first electronic materials man, who turned out to be Eugene Haller. That was interesting because he was right up the hill in the Lawrence Berkeley Laboratory. We searched around and we got lots of applicants, but the best one we could find that fitted our overall needs turned out to be Eugene Haller. Now, that wasn't all that well received, because, well, there are people that thought we need to have some more people, have a stronger component in mining, for example, or a stronger one in mineral processing. But you have to draw the line somewhere, and given the allocation that we had, that's where—that's one of my first moves. Haller was a good hire.

Another instance where—the mineral exploration—you understand, you have to find the ore, know where to dig and so on—well, you could do it by digging, or some things can be done by just flying over and having surveying instruments that—remote sensing, in other words. So we decided we would go for somebody like that. In this case I got involved with the decision to hire a guy who didn't publish a lot of papers. It turned out it was Alex Becker. Becker was from Canada and airborne exploration is what he was very experienced at, had been involved in mineral exploration in French-speaking countries in Africa, for example, quite a broad experience. A likeable guy, but mainly the doubt was that he didn't have a lot of publications. So in that case, we had to get over the mindset that said unless you had a lot of publications you didn't have anything to offer. My basic point was that you'd have to look at what he'd done, and not what he had written about, and that got him hired.

Wilmot: So you worked to kind of enrich the faculty by shifting the focus of hiring criteria?

Bragg: I think so. Andreas Glaser was another hired on my watch, in ceramics. He had come from MIT, I think. I'm not sure who his competitors were, but he—no, he didn't come right away, that came a little later. But the thing I liked about him was that he had a

hands-on attitude that at times I found lacking—don't get me wrong—without a strong theoretical background, I think you don't belong in the university. But by the same token, not everybody should be a theoretician. Even the experimentalists have to be pretty good at theory, and he was—and so, you have some who don't do experiments at all, and every so often you would have room enough for a person like that. Right now I think the department has one or two. But too much of that isn't good, you won't get anything done with it. To put it another way, theoreticians usually have to work hand in hand with experimentalists, otherwise they don't know what to predict or what to explain. So anyway, that was another one that I felt I was responsible for.

Another, Rob Richie, who was very strong in fracture of materials—[clarifying] fracture, things breaking. He had been a Miller Fellow brought in by Parker and Zackay from Cambridge and he had done well. Miller is an award from somebody named Miller where you bring in somebody from the outside. There are internal Millers as well, to get, say, a year to do anything you want. Of course, you have to propose what you want to do. [laughs] But at any rate, after the Miller, this job in mechanical metallurgy came up, the mechanical properties of materials. It came about because Victor Zackay had left. And the reason Zackay left was, he could look at the way the pension money was building up—he was still fairly young—and look at where the department was headed. It looks like he would be better off to go somewhere else, and wound up with two pensions, one almost a full one and another one a partial one, than to stick around Berkeley much longer. Besides, he wasn't exactly *persona non grata*, but the power structure was changing.

Wilmot: In what way?

Bragg: Well, Earl Parker, his buddy, was on the point of retiring, now he's out there by himself, and as I said, there had been some bad blood.

Wilmot: At some point previously he'd actually had the power to really work to bring you on.

Bragg: It changes. As the emphasis is switching away from just thinking in terms of steel, and—well, mostly steel. As it's becoming broader, steel is relatively less important, you see. That particular focus is less important. The chronology here is maybe a little bit hard to follow. Earl Parker had gotten to the point of retiring. That leaves Zackay, who formerly had always worked as a partner with him in sponsoring graduate students, by himself. But also as I say, the bad blood—and it may be that he got an offer that he just couldn't refuse. But at any rate he left. You will still find him listed as emeritus professor, incidentally, if you look at our department. Until he dies, he is still emeritus professor.

Wilmot: Were there other people who were kind of in your corner in terms of the kind of work—you know how people kind of create their own fiefdoms, were there any other professors who were—?

Bragg: That I was buddy-buddy with, or—?

Wilmot: No, I'm sorry, I didn't ask that question well. But what I mean is, were there any other professors who were also focused on thinking about x-ray diffraction and materials?

Bragg: No, as a matter of fact, this is interesting—the place where the students learned crystallography had been traditionally done in conjunction with x-ray diffraction. One reason for that is that you can't really do much in x-ray diffraction without studying crystallography. Now, in the undergraduate properties of materials course, the very first one, E45, I had mentioned that all the engineers had to take, some crystallography is taught, but only a very little. And to get a good, sound basis in crystallography, it has to be taught as more or less a semester-long course. Well, the proper place for that at that time was in—traditionally they always had a course in x-ray diffraction, and of course I always taught that, naturally. Well, it turns out that there are other ways you can do diffraction, and the most common one other than x-ray diffraction is electron diffraction. You can also do neutron diffraction, but not everybody can have a nuclear reactor that's big enough to—maybe half a dozen places in the country where you can do that, whereas almost any department could afford an x-ray diffraction, have several x-ray machines, and maybe one or two electron microscopes.

Well, it turned out that Gareth Thomas had come, he was in the department when I got there. As I told you, I had actually hired him at Berkeley to teach an in-house electron diffraction course. And we actually bought a used electron microscope they had had at Berkeley which was kind of a mistake, but—so there had been some association with him. Thomas was a—when the time came to put in a request for a step advancement for Thomas—the way it's done is to go to the person and say, “Look, we're trying to get you up to step so-and-so. Who should we write that you would like to support your—say that you're good?” And so you get a list of names from this person, but also you get your own list. You won't just depend on everybody he likes, but people who might not like him. Well, we got a bunch of letters that said he was good and all that. We got one, ironically, from the then-chair of the metallurgy department at MIT, who was Welch, Thomas? It was the most vituperative, denunciatory—I guess is a good word—it mostly said—it mostly said he's not nothing! Of course, we didn't use that letter to put the case forward. But a guy at Case Western, I think it was, or maybe it was that school in Pittsburgh, Carnegie Mellon, I forget his name now, but he wrote the most cogent statement that we got. And that was that Thomas' real virtue was not the quality of his research, which was good, but there were other people who were good, but he was doing so much of it and so busy outside promoting the use of this that he had in a way raised the whole level of metallurgy, by his popularizing, and the quality of research that he and his students did. So although he wasn't the greatest by any means, his impact was great.

Well, of course, that's the good part. The downside was that he thought that we didn't need x-ray diffraction anymore, [laughs] which I thought was going too far. He was so much of a promoter of his field, “Well, we don't really need it, we can do that stuff—” Of course, much of what he had to say had merit, but not everybody could afford electron microscopes. And not all problems are amenable to solution by electron microscope. But at any rate, I'm not sure how I got on that, [laughs] except that I remember that incident very well as being one where—you asked about the people who were active in supporting x-ray diffraction—

Wilmot: Yes, I was wondering about—

Bragg: Well, it turned out that the people in the ceramics field tended to use it more than the people in the metallurgy field. And the reason for that was that to study metals, to do

electron microscopy you have to make a thin foil of the metal, the piece you're going to study, very thin, and put it in the electron microscope and shine electrons through it. Electrons will have energies of 100 million volts. And the size of the sample that you're looking at might be not much bigger than like a couple of millimeters wide, a very small piece of material. But you have to thin it, and that's usually done electrochemically. Well, ceramics don't thin easily. Not only that, but they don't conduct electricity very easily, so they tend to charge up. So it's harder to do electron microscopy on ceramics. So the ceramics people tended to use x-ray diffraction more and to understand it better. In fact, they even had one of their own machines in addition to our teaching ones. So there was that component that was in that direction.

And there were still things that one could do with x-ray, many of them of course, and Thomas was actually wrong in his attitude, because with the—well, without going into detail, things like texture, small angle scattering, so many different things that you can do with x-ray that—the better thing to have said was they are complimentary. One's good here and one is good there, and one is good with nuclear if you can ever get to it. So that would have been the appropriate thing to do.

Wilmot: My question was really while you were in the department, how did you kind of build your own fiefdom there, and were you able to do that while you were—you know, sometimes people hire with that kind of intention, and I was wondering about that.

Bragg: Well, I didn't have a fiefdom, what I had was an area that I had staked out. And that came about, when I first arrived I sort of flew off in all directions, but basically only three. [laughs] One, I think I mentioned, one was eutectic solidification. We did some good research in that, it was good, it was published. Did some work on beryllium metal, which wasn't published, and not particularly good. And work on carbon materials, which had the most elusive problems associated with it, and there was the least competition, nobody else was doing that. And also just intrinsic interest. So over time I finally just got rid of the other stuff, other areas, and just concentrated on carbon materials. It turned out that—I might have mentioned that—a whole lot of money had been spent maybe ten or fifteen years earlier by the Department of Energy on carbons, and they feel like—by they, I mean the people in the DOE headquarters felt like whatever is the fad is where the money should go, and it had stopped being a fad and so it didn't get the lion's share of the money. I could have jumped around and gone after the money, but that's not my style, and I preferred to have a modest program. And as long as they continued to fund that I would do well. And I enjoyed what I was doing.

I became very, naturally, very active by concentrating my activity in the carbon field at an international level. So I even became a—on the advisory committee of the Carbon Society for six years, I guess. So I, you know, people who knew, knew me. So in that sense, in a narrow sense I was a world expert. I'm, sorry does that answer your question?

Wilmot: No, that answers my question. You mentioned four people who were hired who were—maybe five, but different positions that came up, and was there a lot of money coming into the department during those years of 1978 to 1981?

Bragg: No, these were—they usually came as a result of somebody departing. For example, Ravitz, who was an extractive metallurgist, passed. I forget his first name [Fred], but he

was an older man. Hultgren passed. We had one slot, it was a young extractive metallurgist mineral processor, Tom Mika, who didn't make tenure and was let go. John Dorn passed. And so people got replaced. You kept the same head count, but now you had a chance to replace people. And so some of these hires were nothing I generated, most of them, but just standard replacements. But we did get augmentations in the electronic materials area. That was in belated recognition that we might as well get with Silicon Valley. [laughs]

I didn't finish talking about Rob Richie. Rob came in because—now, how did that happen? We lost somebody, I guess it might have been Victor Zackay, or—anyway, we had a vacancy in the general area of mechanical properties of materials, and the question is, “Who are we going to hire that can do that? We can't leave it uncovered, it's too important.” Well, Rob had been there on a Miller Fellowship, and so he was asked to apply. We interviewed him, and I remember Doug Fuersteneau, who had a way of using almost rude four-letter words, saying what we needed was a blacksmith. It wasn't that of course, but he dealt with fracture of materials.

Well, when Earl Parker, who had preceded Victor Zackay, had come to the department way back, right after World War II, when the department had gone from mining to metallurgy, so had brought in some new people that weren't digging things—Earl had gone out to get a real hotshot, a highly trained metallurgist. Earl was not a—he didn't have a Ph.D. He was highly experienced, but he didn't have a Ph.D. So here's Victor Zackay who is a hotshot at Ford, had invented a process called aus-forming—it had to do with working the metal in a certain temperature region and then chilling it, and it imparted certain beneficial mechanical properties to the material, and he had done that research while he had been at Ford, so he was kind of famous. Well, when he comes to Berkeley, as a result of being pushed by Earl Parker, he was persuaded to work in partnership with him.

So now we have, in this department, we have two faculty members who were joined at the hip. Nobody else was that way. Everybody else had his own fiefdom, his own group. But they had together a group, and it was quite large, because Earl was great at getting money. But they were sort of joined at the hip, which meant that in a way you're either—and I hope this isn't uncharitable, but something like that had happened to Jack Washburn before, who had a hell of a time getting out of Earl's shadow. Eventually got it, but it took him quite a while to do it, from having talked to his wife, I heard his wife mention this. Well, these things get known, they're not just in your own house, but outside. So when Rob Richie came to join the department he—and actually I had a talk with him, and he said, “I don't know how to do this, but I don't want to take the job because I'm afraid I'll get in the same situation Zackay was in.” I said, “Well, no, I don't see why you have to do that. Sure, Earl, you have to thank him for promoting you, but I don't see why you can't be your own person, you just have to tell him straight out, face it right off the bat, and if he still wants to support you, fine, if not then—it's fine.” So he came in, and he did not get stuck in that situation. It may be that Earl Parker retired soon afterwards and it didn't create a problem. But at any rate, that just illustrates the kind of people problems [laughs] that you can go in that impact on the department eventually.

Well, the salary business, I managed to get people more money in some cases more, another rank even, in some cases for people that I didn't really like that much. Or put it another way, we were congenial, we were cordial, but I had no great affection for them.

But I took the point of view that my job was to promote merit, not my likes and dislikes. So I think that probably got through.

The only other thing that I can think of that I did for the department which made it if not unique—may have been discarded by now, was the annual Christmas party. [chuckles] See, the Hearst Mining Building, which is now a state treasure, you have to go up the hill there on the Berkeley campus, it's a beautiful old Beaux Art building, there's a mining circle, a fountain there. It's being surrounded by a lot of other buildings now, but at one time it was part of the master plan of the Berkeley campus, it looked like something out of Greece or Rome, back in the glory days of the Roman empire. Well, it has a huge lobby with a high ceiling, and grillwork, balustrades around on the second and third floors and so on. The art students get assigned to go there and take pictures and draw pictures of the building it's so out there.

Well, I decided, "Gee, we should have a party here! This is a great place to throw a party!" So the first Christmas I said, "Look we're going to have a Christmas party. Let's get together a committee to run the Christmas party." That thing was just amazing. Students and faculty brought native food, their ethnic foods. We had Indians, we had Chinese, we had Africans, we had all kinds of people. Some of them had talent as artists, they made placards, were doing their Christmas slogans in their own native languages and so on. In fact, most of that stuff was kept and used over and over years afterwards. The mineral processing—the exploration people who had trucks, that went out to the field, brought back a huge tree that must have been thirty or forty feet tall they decorated. It was a great success! We had food, and we had drinks, and we had music, and it was just a great success. And for a few years after that that tradition kept up. I don't know, it may be discarded by now, but that was my innovation [laughs] for the department.

And it sort of went on like that until my time for my turn to be up. I didn't want to make a career out of being department chair. I was the right man for the job at the time, I don't think there's any question about it. But I have come late to academia, and I have not really—it's not going to be too much longer before I retire. And things like going on sabbatical, I have never been on loan to a government agency, I have never been a bureaucrat, haven't done any of that, or have done very little of it. So I decide, well, I'll do my minimum three and get out, which I did.

The last thing that had happened during that time that maybe was worthy of note was I had managed to wind up as the principal investigator for the MESA program, which at that time only existed in the Berkeley area, administered out of the College of Engineering, or rather the budgets and whatnot through the College of Engineering, with the Sloan Foundation and other kinds of moneys. You had to have a faculty member who was the principal investigator, which meant that you didn't do much hands-on work but was responsible—basically we had a coordinator who ran the thing and the teachers at these schools, we had three schools who literally did the day-by-day work of running the program. I was the PI for the MESA program for that—I had been that the previous year. I guess that last year I was PI, the program went statewide, and a big conference was held. It turned out that the W.R. Hewlett Foundation had been looking for a place to make an impact on the production of science, of minorities in science and engineering. Not \$30,000, but half a million for—so now we're going to make a big program. And out of all the programs they looked at across the country, the

MESA program that we had here, that had evolved there over a period of about ten years, looked to be the best. And so it was adopted and that summer the thing expanded statewide to ten campuses rather than just one. So I don't claim any glory from any of that, I was just the PI. The people who had done that for ten years were what made the program go. Well, about that time, I don't know how this came about, but I was approached to go to the DOE headquarters as a detailee, which meant that I was off, took leave from my faculty position and went into the DOE headquarters and became a bureaucrat for a year. So that occurred in '81, after my three years I left.

Wilmot: Yes. Did you know Mary [Perry] Smith?

Bragg: Mary Smith was one of the—she was head of the Oakland Tech group at that time, when the MESA program was only one program. There was a lady from Berkeley High, I forget her name, and another lady from Richmond [Elois Irvin], from Kennedy High in Richmond, who died recently, but they're all math teachers—yes, Mary Smith I knew very well. She's my friend to this day. So that was it pretty much. BESSA I mentioned, or if I didn't—

Wilmot: Well, it's interesting, BESSA, because you became the faculty advisor to BESSA almost immediately when you came to Berkeley.

Bragg: Well, there wasn't any BESSA until I came. Up to that, you see, there was a big, you might say revolution going on. We have a lot more, probably, I'm sure because of affirmative action, we have a lot more black people in all fields on campus than we ever had before.

Wilmot: When you came in 1969.

Bragg: Yes. And so now here's this new black professor of engineering, and we have now maybe fifteen or twenty black engineering students, whereas before they might have had one. So naturally you join or you make an organization. And at that time I think there was Mel Ramey, who was a graduate student at Berkeley, had been an undergraduate—I think he went to Imperial College in London for a year and came back—but just about to get his Ph.D. Ben Darden I think was around. Ben got his Ph.D. as well. I think they were the only black graduate students around, but I don't know who called the meeting, but they were there, I was there. The logical thing is to have a faculty sponsor, and so—not by default, but just because naturally I volunteered to do it.

Wilmot: And they approached you?

Bragg: I don't even remember all the details except that it just seemed like it was the natural thing to do. And that kept that—that filled that role until the time when I went away to DOE in Germantown. I was gone for a whole year, and things weren't the same when I came back. Student organizations don't have much of an institutional history.

Wilmot: At Berkeley.

Bragg: At Berkeley, certainly, at least at that level I saw. You might have a sophomore being made president, who might not even be around next year. And I tried to instill in them the same kind of method of operation that I had seen in all the viable professional

organizations I had been in, that you came up through the ranks. You started on some committees or something at the lower ranks, and then you sort of moved through the offices until you got to be the president, secretary, treasurer, vice president, president. And not everybody is going to be the president, of course, but what they would do would be to jump somebody to president just because he was popular, who last year maybe didn't even know how to read the books. So I'm not sure how much of it I was able to get through, but I tried to teach that. Also at times when things would happen that didn't go down too smoothly, tried to be their advocate, but also the advisor and mentor.

Wilmot: What types of things are you thinking of?

Bragg: Well, I'm thinking of a case where one of the—somebody on the dean's staff made some remark, which I didn't hear—but two students are talking about some issue where one black student gives advice to the other, and this—I'm not sure about the language, but it's something like "the blind leading the blind," it was a kind of derogatory remark.

Wilmot: About—?

Bragg: From a faculty person about these black students. Well, I'm not sure exactly how I handled that one, but a better one was—well, I'm sure what I did was to go to that person and confront him with it and tell him that you don't do this. You don't go ahead and bring on a lawsuit every time somebody makes a derogatory remark, unless it's persistent. Once you do this a time or two, you don't get that anymore. The one I'm thinking of thought that—

Wilmot: Once you address people's ill-advised comments?

Bragg: Yes. Sometimes, you see, they had been so used to being, well, the old ways that they're—some of them it was just insensitive, and some of it is just a need to be re-educated to the new reality.

Wilmot: So you interceded a bit on behalf of the students around issues of that nature?

Bragg: Yes, where there is something that indicates they are being regarded as second-class or third-class citizens, I'd bring them up to first class. Sometimes the students could shoot from the hip. For example—[laughs] you had better turn this off, because—.

[interview interruption]

Wilmot: So we were talking about BESSA and the role that you played as faculty advisor for BESSA. So you remember when they were started.

Bragg: I don't know exactly, but it must have been just as soon as I got there, because I can't remember when we didn't have it, let's put it that way.

Wilmot: And you said that they formed later than any other black student organization.

Bragg: Yes, before I got there was no black engineering and science students' organization. I think it's the confluence of—the consequences of affirmative action there. Now we have

black faculty on campus and we have more black students on campus. There might have been one or two black students in engineering before the late sixties, so you don't need to form a club for that. But by the time you get to being fifteen or twenty or more, and we're now talking about engineering, science, which would be engineering and physics and chemistry, anything technical like that, they all wind up in the same umbrella, them being—. So it's about—it sort of happened because it could happen then. I'm there, and the word gets around, of course. So I don't remember even the original organizational meetings, but right away they need a faculty sponsor, and naturally that sponsor becomes an advisor as well, but technically I was the sponsor, and all organizations had to have a sponsor, otherwise it's just out there and has no official recognition by the university.

Wilmot: As far as you knew was BESSA well supported by the administration?

Bragg: I would say that they were supported by the administration, I don't recall any acts that raised concerns about being discriminated against. I'm not sure that—and in fact I know that there were faculty members who didn't have the highest expectation for black engineering students, and were, well, said to have made derogatory remarks from time to time. But those I don't have documented. When that would happen—that happened only once or twice—I'd go to the professor questioned and give him some sensitivity training. You don't need to make a big newspaper splash out of every incident. Sometimes my attack was to try that first. If that didn't work, then you'd get rough.

But BESSA formed, and at first we had graduate students and undergraduates. The first—I forget who the first president was, it was either Ben Darden or maybe Mel Ramey, Mel Branch rather. Branch, he eventually went on to a full professorship at the University of Colorado, which is where he had come from. Ben Darden became a professor at Cal State, San Francisco State U. But my main role was to be the guy that the university holds responsible for what BESSA does, and to intercede for BESSA wherever it needs some faculty intercession, let's call it. So the quarters that BESSA had were in the old North Gate Hall, and there were a couple of rooms that they had, it might have only been one to start with, but they eventually I think wound up with two, with offices, and furniture, things like that.

There were other student organizations in the building as well, so it wasn't like "You people be out there, and us are over here," it just happened that they were late forming, there weren't any black students there to form one earlier. So that was the natural outcome of time, you might say.

So that relationship went on until, as I said, until I went away to spend a year with the DOE. Up to that point I was in fairly close contact with the organization, made many of the meetings. The most important thing I would do I thought was to try to counsel them on how professional organizations work, things like line of succession, setting up a proper framework for what you do. And helping in establishing programs, which they turned out to be very good at, mainly concerned with recruiting blacks into the engineering profession. They did very good work on that, I think, going back to schools where they had gone to school to make speeches about you can get into engineering, producing brochures, instructions on how to apply, very practical things, very pragmatic. I was very proud of that generation of BESSA students who all remember when it wasn't that way, you see. So I thought it turned out some very good students.

Not just men, either, one of the BESSA students, Donna August, who eventually went off to Carnegie, she is a computer type, and wound up with her own company, donated money to BESSA. [laughs] She was a tiny little lady, but lots of smarts. I enjoyed those students, they were nice.

Wilmot: And your sense was that BESSA was generally supported by the administration in terms of resources as a group? [Bragg responds nonverbally] Yes, okay.

Bragg: Now, some of the BESSA students actually had been MESA students eventually, not the initial ones, but—

Wilmot: Oh, the two organizations were connected.

Bragg: Well, not—just through aspirations. MESA was an informal, or rather an organization that operated out of the College of Engineering, but community-based, that is to say, it was out in the schools in Berkeley, Richmond, and in Oakland. But the point of MESA was to get students to major in science, engineering. So their idea of success was a MESA student would get admitted to Berkeley, that would be a MESA success. So we had many students who came to Berkeley through MESA. And naturally, the university, which is supportive of that because it's a university program in a way, as College of Engineering and the faculty sponsor—in my case just before I left I had that job, it's connected in that sense. But there's no formal connection between, say, you're a member of MESA, therefore you become a member of BESSA, that wasn't true.

Wilmot: Right, I understand that. You mentioned that maybe your other interactions with African American students—this is again when you were serving on the court, the committee—sorry, I'm missing the name.

Bragg: Admission, or thesis?

Wilmot: No, there was a committee your first year, a student affairs court—

Bragg: Oh, [laughs] you mean the student conduct committee?

Wilmot: Student conduct committee.

Bragg: That's negative. [laughs]

Wilmot: Yes.

Bragg: No. [laughs]

Wilmot: But the thing that you mentioned that the other interaction that you had with African American students was serving on individuals' doctoral committees and thesis committees, and that sometimes, well, frequently you were—

Bragg: The word frequent would be maybe a misnomer. But on occasion, fearing that a student might not have the most aggressive—most—okay, aggressive support from their own thesis advisor, or to put it another way, that people reading the thesis were disposed to be less than fair, wanted to have somebody on the thesis committee to know exactly

what is going on, and not necessarily to applaud nonsense, but just to ensure fair play. So I served on several committees—several, that's three, that I can remember—people in the School of Education, and one in mechanical engineering that I don't even remember seeing the guy on campus until he asked me to serve [laughs] on his committee. He was working out of Livermore, but he asked me to be on his committee for the same reasons.

Wilmot: These were African American students?

Bragg: Yes, they are all African American. Well, it was just fear that they might not get a fair shake.

Wilmot: And was that because of the topics of their dissertations, or—?

Bragg: Well, it is just a suspicion about whether or not white people are going to give them a fair shake. That's basically what it came down to. Not at all sure that—just a little bit apprehensive.

And I'd have to say that I did not see that in my experience on these committees. One committee, it was a bad thesis and it should have been thrown out, and the last I saw it was rejected. And I told him so, the student. So that was a case where it wasn't going to get by just because he was black. But the others were good pieces of work, and I don't recall any tiffs about them.

But I was going to say that that's probably more likely to be the case in the hard sciences than in the humanities and the social sciences. For the simple reason that one is subjective, basically, and the other is not. And I had a friend who, for example, got a Ph.D. in the classics at Stanford, had a hell of a time getting her Ph.D. approved. Because here is this black woman, actually coal black, having esoteric ideas about the classics. When everybody knows, "What do black people know about the classics?" I mean, that's the attitude. So they would get these cut-up manuscripts, or without any real rhyme or reason, just tear them apart, and the main reason is there is no way [laughs] that they're going to get a fair shake from that kind of a person on the committee. So there's enough experience within the subjective areas of the humanities and social sciences, at least going back, that candidates really have a hard road to hoe.

Margaret Wilkinson told me that—she, you know, was a very mild-mannered person, very, very smart, she taught in the English department at Berkeley as an adjunct professor or instructor. Never could find any reason for her to be, when they have a search for another faculty member, never could find a reason to bring her in. She did all kinds of things, ran institutes and whatnot, but wasn't good enough to join the faculty. And finally the administration created another slot in Afro-American Studies, because she was ready to leave the university. Rather than lose her, the chancellor said, "Well, we can't force her on English, we can try to make them change their views later, but you couldn't just tell them to take the person. You don't do that." But so that's how she happened to wind up over in Afro-American Studies.

But when that subject was brought up about white people's opinions about what black people know, it can be brutal if it's at all subjective. So I can see the paranoia that goes with that, when you're coming up, you're at Berkeley and you want to get your Ph.D.,

and you're making comments or you're taking positions that are new, otherwise it's not news, and who justifies that black people have anything new to say? You can see the paranoia, I can see it.

At any rate, I did understand that despite all that, the experiences that I had, I had run into one case where it really wasn't much of a thesis. It wasn't bad, it just didn't say anything. And the others were good pieces of work, you know, there were editorial things that you'd run into, you'd clear this up and whatnot, but basically were good pieces of work, so it didn't cause me any great falling out with anybody over it. Nevertheless, they felt that I [laughs] helped them, and I probably did. [laughs] Yes.

Wilmot: Good. We spent some time talking about your time at DOE in the past, but I was wondering if we should just kind of—

Bragg: I think we ought to finish that up, because that—yes.

The DOE was interesting in that the way it works, in order to ensure that the staff—first of all, the DOE hierarchy, the structure is to have this directorate, which in the science and engineering has subgroups in that whose job it is to administer DOE programs. Now, the DOE has an overall mission, here's what Congress says thou shalt do. How it got that way is another matter; but ultimately it has a mission; the mission may change, but it is agreed upon by the Congress that this is what you are pursuing. Let's say one of the things that—it finally trickles down to where we need to have more superior steel. Well, somewhere in this directorate there has got to be some work that addresses that issue of making a superior steel. But there are all kinds of ways of getting superior steel. You can make alloys; you can change the processing; you can do a lot of different things. But basically, how the money then—how the final decision at the working, at the laboratory level is decided, is through the program directors, who finally have responsibility at that level.

So in the DOE office that I was in there was the director, and there was one guy who handled large facilities, another guy who handled ceramics, another guy who handled metals, and I think mine was materials chemistry, that I had. Not that I was a chemist, but I had a broad background and they had just lost a person by retirement out of the head count. It was a pretty lean organization. The National Science Foundation would have had three times that many administrators. But the reason why they didn't need many more people was that most of the DOE money went to the major laboratories where there are maybe three or four thousand people. And the administration, the details were handled at that level, and just more or less signed off on at the Department of Energy headquarters. So I had took over for a guy who had been responsible for materials chemistry, I think my budget was maybe five or ten million, I don't remember, it would have been something like—it wasn't a very large amount of money.

Wilmot: And you took a leave of absence from Berkeley?

Bragg: Took a leave of absence, you go on TDY or something like that, which turned out almost like a per diem basis. It enabled me to rent a place—

Wilmot: And this is in Germantown, Pennsylvania?

- Bragg: Yes, Germantown. And essentially set up home for a year in Germantown. And it was interesting in that I got to see how things were done. Now I understand the full cycle.
- Wilmot: Was that why you pursued that opportunity?
- Bragg: Well, I just didn't know what a bureaucrat did, and I thought it would be interesting to see. On the campus we saw it, as the receiver. On high. But now I'm much closer to on high, and now I see how they see things, so it gives you a broader perspective. Not only that, you not only see what you've been doing, but you see what other people are doing.
- Wilmot: How does that new kind of exposure feed into your practice when you came back to Berkeley?
- Bragg: I knew more about everything than I had known before, and I knew who was doing—if anybody—was doing the kind of stuff I was doing.
- Wilmot: In the field, yes.
- Bragg: Yes. It turned out it wasn't very much. But in terms of overall grasp of the picture of science, materials science in the country, it's an unparalleled opportunity to get that perspective, because at one time or another you've either read a report on everybody, what everybody has been doing, or you've had to read proposals coming from people who didn't even get any money, but the ideas are out there. And on top of that I managed to—I'm not sure whether right then or if not soon afterwards—wind up on the materials research advisory committee of the National Science Foundation, which covered essentially the same ground, but with a different structure above it. And about the same magnitude of the total budget. So between the two of them I knew pretty much what was going on in the country, and just about everything. I had access to it.
- And I found out that who sets the agenda. The staff is professional, at one time they were probably very good professionally, but now they are administrators. So while they read a lot and they keep up, to that extent, there are other people out there who are on the firing line who are doing the research currently; they are current, they are really at the frontier and they are razor-sharp. So what you would like to have is a representative collection of frontiersmen, in the scientific sense, to advise you on where to go next, what to keep doing and what not to do, and so on. So this is an advisory committee, and they meet once a year to take a look at what has been done, at the stuff that has been done for the division, and also to assess the state of the art, you might say. And not too surprisingly, each one has its own axe to grind. But that you know is going to be the case.
- Wilmot: You mean the committee of advisors?
- Bragg: Yes, now, the program directors are not compelled to follow their recommendations, but they had better have a good idea of why they won't do that because after all, these guys are high priests, they wrote the bible, more or less. And so it turns out to be a very interesting exercise to see how—you know, when the committee meets and discusses this work, sometimes the candor is unbelievable. I mean it's just—. But when you cut away the part that hurts, some of it is—most of it is objective. Sometimes it's not. I've seen cases where without any justification whatsoever except what they say, "Oh, this is

no good, it can't go anywhere," and so on—in other words, with no, “Yes, but—.” But again, you run into that basically when it comes down to funding the individual proposals.

Proposals are sent out to be reviewed by usually three to five people who are presumed to be competent enough to review and recommend. I'm talking about now at the individual level how the money actually gets handed out. First of all is, does it fit under the umbrella of the charge, the mission? If so, are there others that look better in terms of the mission? So, there's some judgment here.

Wilmot: And this is talking about the NSF, and not DOE?

Bragg: No, it's the same way. The DOE has a mission, but it's not terribly different from the NSF. Except that the DOE of course is—somewhere in there energy is relatively the open sesame.

[interview interruption]

Wilmot: We left off with the DOE mission and energy was the open sesame.

Bragg: Yes. The National Science Foundation has a more general charge, and that is this research is in the national interest, and it was established around the late forties, after World War II, when it was recognized that much of our success in World War II had to do with improvements in technology. The invention of radar, proximity fuses, the atom bomb, advanced materials and the jet engines, all this stuff. Of course, our jets didn't come in until later.

But anyway, the point is that much of our success in World War II had to do with advancement in weaponry. Most of it had to do with science and engineering, all of it. So luckily we had all these people, plus refugees from Europe who would come out because they were afraid of Hitler, that got marshalled into this powerful machine that enabled us to not only win the war but dominate the peace too, for that matter, but the manufacturing was later. At any rate, because of the success of things like the Manhattan Project or the MIT Radiation Project, or things like that, the National Academy of Sciences essentially sponsored a study that proposed the establishment of a science foundation to essentially make sure that we are never in a position of not having the forefront of science. We just happened to have it because of various—there had been some military support of research, but not really basic—most of it from people who had been at universities on very minute budgets, typically. But the recognition of the wartime role of science and engineering led to the establishment of the National Science Foundation [pounds table for emphasis]. So that meant that forefront science would always be supported, it didn't say at what level, but it would always be supported.

Now, the Department of Energy, though, comes along, it was an outshoot of the Lawrence Radiation Laboratory, or better still—how did this go?—nuclear energy was unknown before as a thing to worry about before the atom bomb project. And for a while nuclear became a whole category by itself. I can't remember the name of the agency, but it became a huge agency, which was inherited, and sort of grew out of the wartime experience of having laboratories, large numbers of people working in different places, like at Berkeley, like at Los Alamos, like I guess, partially out in

Livermore, Sandia, at Iowa State University, of Argonne National Laboratory, of Oak Ridge, Tennessee. All these things came into being—billions and billions of dollars during World War II—all around producing fissile material. But the technology and stuff that went—not just producing materials but the science of bomb manufacture, of bomb design, and so after a while you began to see it involves kind of everybody in a way. Nevertheless it was—I forget the name of it, but it was a whole nuclear category by itself. And supported from that, of course, were all these things that had been set up during World War II and they just sort of got grandfathered in. Well, you can see that a given electrical property may be useful for some part of a bomb, but also there's a science underneath that electrical property that doesn't necessarily have to do with the bomb.

So you might have a guy work on it for this reason here, and a guy over there work on it just because it's important, or interesting, or vital. So that way you can see that you're going to have—the Department of Energy, which came from the old Manhattan Project, and trickled down through—and Energy Research and Development, I think that happened under President Carter where for a while there, because of the oil problem, the oil embargo that just scared everybody to death, “Well, we've got to focus on energy.” So we go from nuclear energy to energy. So now all these people become part of ERDA, that happened for two or three years. Then the next administration comes in and says, “Well, no, we want to call it the Department of Energy.” Well, it turns out that almost everything you do in science involves energy, so [laughs] everything is fair game, so it looks like the two are really duplicating each other. Still, and to a large extent that is true. But the objectives are stated in slightly different ways.

Anyway, it was interesting. I did my three years. I found that very interesting to see, what went on where. I visited every one of those national facilities.

Wilmot: You were there for three years?

Bragg: I'm sorry, only one year. In that one year, the guy who was director when I first came asked me if—he said, “You know, we would really like to put some research money at the historically black schools. And we tried that a little bit, but it didn't work out too well. And while you're going around, I'd like you to see if you could find places where we ought to be putting some money in.” Words to that effect. Well, it turned out that because I was there on a different arrangement, essentially like a consultant or a per diem, there was plenty of money for me to travel. Wherever I wanted to travel I would just go. A convenient time to go is when each lab has its annual review of its programs. So that's when the people from the Department of Energy headquarters show up and review the program and discuss how they are doing and have some interaction. So I made it a point to visit just about every one of them. I went to Brookhaven, to Oak Ridge, to Los Alamos, to Sandia, and actually I had been at Berkeley. The Hanford engineering works which had become Battelle Northwest then. I didn't go to Idaho, but I visited the program at Illinois, at MIT, Brookhaven. Just about all of them.

And often I would make like a side trip, especially when I was down South. At that time there were six historically black schools that had viable engineering programs. And some had engineering programs with adjoining schools, like in Atlanta you could go three years at, say, Morehouse or Spellman, and then two years at Georgia Tech. So it took you five years but you wind up with a degree in engineering. So anyway, the ones

at that time that had quantified engineering curricula were, I guess it was Howard, Tennessee State, North Carolina A&T, Southern, Prairie View A&M, I think I got them all.

Wilmot: That's five.

Bragg: Read them back. [laughs]

Wilmot: Howard, Tennessee State, North Carolina A&T, Southern, Prairie View A&M, and you started to say Tuskegee but then you took it back.

Bragg: Now, there was Southern University in Baton Rouge, and I think the other one was Texas Southern, I might be wrong. But anyway, whatever they were, I had visited every one of them. Plus others, if I happened to be close by.

What I found was that first of all, the infrastructure for engineering typically was woefully inadequate.

Wilmot: In terms of like machines, tools, laboratories?

Bragg: In terms of the quality of the supporting science. What you need is a good background in math, and you need good chemistry. And if you're going to do engineering, you need to at least have enough physics to get you through the sophomore physics anyway. Well, a typical historically black school has a math department, but it's not a very big one because they don't turn out mathematicians. And they'll have chemistry all right, because one of the careers available to black people historically have been nursing and medicine. So you won't find a historically black school of any consequence that doesn't have chemistry offerings. Won't be much on math, but they will have chemistry.

The other reason for having chemistry—you might have biology. Because in those days you could do biology—chemistry with a few test tubes and petri dishes, and biology you needed a knife to cut frogs and something, a few microscopes. And I'm overdoing the case, but the infrastructure that it took to support that viable level wasn't very expensive. But engineering, your education is expensive, and a physics education is not cheap. And also faculty—the students usually come from schools which are not very much enriched at the high school level—so they do a lot of remedial education. In addition to that, the faculty is overloaded. They teach so many courses that even if they had money, they wouldn't have time to do the work themselves. And the kind of research we're talking about usually is done by graduate students.

Wilmot: Did you bring all this information back to the DOE?

Bragg: Yes, but that wasn't news.

Wilmot: It wasn't news.

Bragg: Well, I'm not sure how much they understood, but if you talked to any black HBC [historically black college] faculty member, he'll tell you the same thing, that it's very difficult to do research because first of all, at one time you didn't have the money. But even if you had the money, you didn't have the time. If you had the time, you didn't have

the graduate students. And most of your work gets done by graduate students. So it means that by and large, to be competitive for the kind of research we were funding at places like Stanford or Ohio State or Berkeley or wherever, where they've got all of these things, plus the pick of the students and whatnot. They just—it's hard to do anything that's competitive. And to this very day there are a few schools, historically black schools, that are doing good research, but basically on set-aside money. In other words, money that they probably wouldn't get if they had to come through the DOE or NSF, or if not NSF, as an education directorate within it, something that—it's a different kind of money. Not that you shouldn't take it and do good work with it, but they're just at a competitive disadvantage.

I ran into one young guy at Prairie View A&M who showed me his lab, who was really very nice. He had done some work in NMR, I think, something like this, some state-of-the-art research.

Wilmot: Done some work in NMR?

Bragg: NMR, nuclear magnetic resonance. It was state-of-the-art research, the equipment that he had—but he was just joined there, he was practically the chemistry department.

Wilmot: And this was—

Bragg: At Prairie View A&M. Yes. And there was no way he was ever going to get around to doing any research, considering all of the duties that he had, and no graduate students. So it was sad. I hadn't really realized how bad it was until I saw this again and again and again. Teachers who really want to try, they really want to do something, but the situation is just not too conducive to that.

Now, there were people that tried to get around this to some extent and did get some things done. For example, I visited Jackson State in Mississippi, which didn't have an engineering school, for example. But I went there at the invitation of a guy who had been the chairman of chemistry who had spent some time at Berkeley on sabbatical, to suggest that we recruit students to come to Berkeley to do engineering. Undergraduate degree in any of the hard sciences or mathematics would be enough with the appropriate level of performance. And typically what you do is you go and you give a talk and you make a picture about, "Here's what you have to do to get into Berkeley." And what I found was at this particular school, the chair had managed to double the size of the chemistry faculty by making faculty members go out and get grants to pay them half their salary. And his argument was, "Well, if you're not good enough to get some money, you shouldn't be teaching us." Well, I'm not sure that I agree with that, but the point is that what they would do then would be to get a grant, they would give them release time, and also maybe support one undergraduate to do some measurements.

Well, some work will get done, but it won't be very sophisticated, because by and large the forefront is more demanding than that. So it's—this is 1981, and there have been improvements since then. More money has gone into infrastructure, quite a bit more. But they're still confronted with the same basic problems, I think: there's not enough money, too heavy teaching loads, and no graduate students. Without a graduate program, the level of sophistication that you can produce is just not very high.

Wilmot: So what did you do with this information?

Bragg: Well, that, I just reported back—

Wilmot: How did this inform either your path or else DOE's actions?

Bragg: The only thing it did at the DOE was just let them continue to do what they were doing in their basic—well, “Our mission is to do this.” Now, I think they—I forget, there was one guy, there was some kind of an outreach program they had, but not through that division. It was some education office. So the best that I could do was to go back and I think there was one place where I thought—oh, it was at Atlanta [University], AU, which had a graduate program. It was a graduate—a school produced to do graduate work. And there was some good work going on there by, I forget the man's name, but anyway there was no question the quality of the work going on there was pretty good, so AU I could recommend. I'm sure they got money.

Oh, Howard was another matter, they—I don't remember if I actually—I don't remember about Howard, but certainly they had graduate programs already.

Wilmot: And on your CV it said you spent a quarter at Howard University.

Bragg: I did, and the reason I did that was—that was before the DOE.

Wilmot: What year was that?

Bragg: I don't know, but I had been at Berkeley for about four or five years before I took any leave.

Wilmot: 1970-something. Okay, what was that experience like?

Bragg: Well, it was interesting, because—see, I did that because I had never, from the time I left elementary school in 1933 onwards, the only time I ever had a black teacher at all was the one lecture that W.E.B. Du Bois gave our sociology class [laughs] in 1930, '37, '38. So I wanted to have the experience of being around a lot of black intellectuals, or at least black professionals. Now, it turned out that the dean of the school of engineering at Howard, the person was named Percy Pierre, I had met—he had been out to Berkeley for some reason, or I had met him somewhere, and he had said, “Why don't you come and spend some time with us?” So I decided, well, it's about time to take at least one quarter. And I elected to take it there. Well, he had some money that he could pay for my housing and stuff. So that's why I did that, and I just sort of rattled around in the school's college of engineering and got an idea of what they did and who did what and so on, it was interesting.

And I found that certainly Howard was much better prepared than the traditional HBCU. Howard is basically a line item in the federal budget, you see, which meant that they have salary structures very much like the civil service. So Howard people are not poorly paid. And the Congress had set out to educate freedmen [laughs].

Howard had civil, electrical, mechanical, and chemical engineering, I think. Nuclear was really just not much. But civil, electrical, and mechanical were pretty good, I

thought. Oh, I think they had chemical engineering as well, and maybe nuclear was inside chemical engineering for some reason. Smart young guys, very dedicated. I thought that the attitude that I saw, I think I was attached to the electrical engineering department for rations and quarters, more or less. What I learned was that, even at Howard they did not exercise the stringent admissions standards that would be typical of a white school. In other words, you had a problem, but not as much of a problem to get into Howard. But it didn't mean they were going to let you out with a degree easily. In other words, they did an enormous amount of remedial work, and if you were going to teach at a historically black school, you have to be prepared to do remedial teaching, because they come very often poorly prepared. So the faculty, who was effective in one place—well, you have to have that understanding that that's part of your mission, you can't throw that all away, or you won't be effective there.

So when it came to getting their degrees they were very serious about, "If you go around with a degree from Howard, after all you're going to represent the school when you leave," so it's easier to get in, but pretty hard to get out. That was very impressive to me.

It wound me up on a committee on the Scientific and Technological Applications of Materials Processing in Space, STAMPS committee. And the reason was that Percy Pierre was the dean of engineering. And in Washington, D.C., there is kind of a mafia. If you happen to be around the mafia, you are at the seat of everything, headquarters of everything. And NASA was putting together a committee to deal with this subject matter, materials processing in space. You might have read where they flew an experiment, and they grew some pharmaceutical chemicals that are going to cure cancer or something like that. [chuckles] Well, most of those experiments that have been done have been ad hoc. They'd have a vehicle [space shuttle] that was going to fly, and there's a little space left on them, "What kind of experiment can you put in here that we can do?" So a lot of the experiments that were done in the early days were ad hoc, very little land-based information to say, well, once you did the experiment, was it any better than you could have done on Earth? So on and so. So they had wanted to form this committee, and they came to Percy Pierre to ask for a recommendation of who would go on it. So he recommended me, just like this I wound up on the committee. So I served about a year on that committee. It was quite an interesting experience, I might add.

Wilmot: And this was when you served a year on the committee from Berkeley?

Bragg: Yes, I'm back at Berkeley. But the appointment was done, you know—

Wilmot: What was interesting about it?

Bragg: Well, what we did was to have hearings, and we reviewed all of the work that had been done on NASA missions. And then we had hearings from people who either had had experiments or wanted to do experiments. Well, the basis of all that, we finally had to make a series of big recommendations about what to do. Of course it turned out that on that committee, that was interesting because the head was a guy from Bell Labs, I don't remember his name now, but he had made quite a name for himself in the early days of the semiconductor industry, on leave from Bell Labs. There was a guy from MIT who eventually became the head of the CIA. Remember the guy who was caught [laughs]

with his computer at home? Well, I forget the guy's name (John Deutsch), but he was a really obnoxious guy. [laughs]

Wilmot: Who represented a security risk because his computer was at home with confidential, classified information on it, which was open to the internet. Yes, I remember that.

Bragg: Well, I'm not sure how bad it was comprised, but it couldn't have happened to a better guy. [laughs] He was kind of arrogant—not kind of arrogant, he was arrogant, and rude. There were people there from Texas Instruments. I'd say it's fair to say that it was a blue-ribbon committee, except for one brown ribbon. [laughs] That was me.

Wilmot: Let's hear it for the brown ribbon, that's great.

Bragg: And we met for a year, and at the end we wrote a report that essentially said that much of the research that came out with these glowing statements of how great it was didn't have much of a basis in reality, because a lot of them could have been done less cheaply and better on Earth. So, not that we shouldn't do experiments in space, but they should be preceded by ground-based research, because that gives you a target, or rather a baseline against to measure. “See, here's what you can do on Earth, now do you do any better?” A lot of it had never been done, and so that was one of the biggest complaints.

So in a way it hurt some feelings. In fact, I run into people who, once I said that, didn't want to talk to me anymore. [laughs]

Wilmot: Once you said that you had been on that committee?

Bragg: Yes, right. They were pretty sensitive about what they had done, and you could understand that, but the fact is usually guys who did those experiments usually were not that well funded, you see. Because if you're told at the last minute to fly something on there, and you've got your research program going on very good, and this is not your central theme, you don't do that. So many of these, most of the experiments that were being done then were not by front-line people, who were—needed money more than others did. And it doesn't mean that the quality of work they might be capable of doing was inferior, but it was too rushed. That was the main conclusion that we made, and so hopefully, I'm pretty sure what did follow was NASA adopted the recommendations, not too surprisingly, after all the high priests [laughs] had told them what the bible was. But I mean, once you looked at it it made sense.

Wilmot: So a year after you came back from DOE—

Bragg: Now, I might have gone on sabbatical again.

Wilmot: To Bordeaux? We haven't talked about Bordeaux at all. Should we talk about Bordeaux now or should we talk about Bordeaux and being—?

Bragg: Well, it's 1:40, so I think maybe we ought to pick that up next time.

Wilmot: Okay, we'll do that. We have a lot of important material to cover next time, especially with this Faculty Assistant [for Affirmative Action] position. Okay, let's close for today.

Interview 13: August 16, 2002

Wilmot: Interview number thirteen, Professor Robert H. Bragg. Today is August 16, 2002.

Bragg: Right.

Wilmot: I was hoping to start today with—just to ask you about, you said that you went away on a trip to your cousin's funeral, and I wanted to hear a little bit more about what you've learned as you continued your research into your family background.

Bragg: A little bit. I've learned that I'm not at all good at doing this kind of research.

Wilmot: What do you mean?

Bragg: Well, it turns out that—I spent several days at the public library in Memphis, because they've got a very good genealogical section at the library—a brand-new location, incidentally—decennial censuses, things like that. Well, I was there in March for a couple of days. I went through on the way to a meeting and stopped off there, and I just happened to meet a guy who knew about some Braggs in Collierville where my grandparents had come in 18—somewhere between—at least no later than 1880. And exchanged cards and things like that. After the funeral—the funeral of a cousin who was one year younger than myself, a nice lady, I really liked her—after that I spent a couple of days at the public library again. I had called this guy telling him I was going to be around and hoped he could meet with me there. Well, he had taken it upon himself to do some studying. It was my own case, mind you. And he had summarized very neatly all the significant information that I had, stacks of stuff that—maybe an inch thick of—of course, I had done a lot of writing letters, and going and photographing microfilms and stuff like that. But maybe some of this had to do with increased availability of collections, stuff that at one time was in individual files was now in catalogues. So some of it I think was just because it's easier to do now, and I maybe could have done it. But I was impressed that he had done so much in so little time compared to all the hours and days that I had spent, that I realize that that's not my long suit.

But not only that, the good news was that I may have an insight into how to make further progress. You see, what happened was that having located my father's father, born in 1855, somewhere in Alabama, the records say, and his brother, Peter, who is about five years older, in the census of 1880, I had never been able to push things back any further. I had been able to go back at least ten years earlier on my mother's side to 1870 where my mother's mother, then ten years old, was—I forget the age—but at any rate, I had been able to do a little more on that side. But on my father's side I had just run into a stone wall. Nothing showed up, and I was just sort of at loose ends.

Wilmot: You said your mother's mother at ten years old—

Bragg: Well, the reason I stopped was that I had the—the numbers looked not quite right. My mother's mother in 1870 was living in Holly Springs, Mississippi, going to school. She was about a year old, because by 1890 she has just about graduated from Russ College. And two years later she is married and has children. So I had the numbers a little bit

wrong. Incidentally, by that time my great-grandmother is only about sixteen, fifteen or sixteen.

At any rate, having run into a stone wall with no really good ideas what to do next, and doing this sporadically, so it takes me a half a day or so to get caught up to where I was last, which isn't the way you do research well. One idea that he came up with that I had thought about but didn't really get very far was maybe the thing to do, since in those days blacks were not likely to be taken seriously in any kind of official doings—census takers would be white, they would misspell names, they wouldn't get them right—and people would be afraid of them, afraid of anything that's white that comes around, sneaking around. So there are any number of reasons why it would be easy to get missed even after you began to be the subject of being enumerated. The would have been the first decennial census where blacks who had been slaves would now be counted, if they were still alive, would be in 1870, because the Civil War ended in 1865. Now, there were freed blacks who were free right there in Alabama, Mississippi, all throughout the South when the Civil War began, so it wasn't that everybody was a slave. But there weren't many freed ones.

But at any rate, how does it happen that these two brothers wind up on a farm of a white man who doesn't have the same name? And how do they get there from Alabama? So I don't have the answer, but his idea was that, well, maybe there's some connection between the farm owner and these brothers. Now, what connection could that be? Well, it might be that they had been bought earlier, or had been recruited earlier in some way, a number of reasons. So I had thought of, since I ran into a blank wall on the Braggs, hunt the guy who owned the farm, the white family.

Wilmot: Interesting.

Bragg: Well, I did that.

Wilmot: What did you find?

Bragg: Well, I ran into nothing on both ends. The trail petered out going forward to 1890, rather, well, to 1900, because the census of 1890 was destroyed by a fire, it doesn't exist. So another ten years has gone by. But going the other way to 1870, whatever I found just didn't lead anywhere. Well, it turned out that I had read the person's name wrong. Instead of "Hunt," which I had hunted, it was "Hart." And it turned out that there were Harts in Collierville. Of course, they were there, of course, but not only then, in 1880, but in 1870 and 1860. So that Harts had been there in Collierville all along. So now the question is, how do these Braggs get connected up with these Harts? And that's the one we're trying to look at now.

One possibility is that one of these Harts married a female Bragg who brought her slaves with her. So where the story ends right now is that that's the avenue that we're trying to follow now. I've enlisted the aid of Sylvester Lewis, who [laughs] won't take any money, and I can't afford it anyway. [chuckles]

Wilmot: Who is Sylvester Lewis?

Bragg: He's the man who lives there in Memphis whose hobby is doing this kind of genealogical research and took it upon himself to go down this route. It leads into all kinds of interesting detective work, because what movement, what great social phenomenon moved this person from Alabama to Tennessee, to Memphis? Well, one thing going on then was driving all the Indians back west, Trail of Tears, perhaps you've heard of stories like that. And when the Civil War ended, of course there was a lot of unrest, people who had formerly been slaves, their labor market, you see, at that time didn't exist, there was no significant labor market. So that owner now, who had had 100 slaves suddenly doesn't have any employees! They may not want to work for him, and these slaves may not want to work for him either. So that's how the sharecropping got started, incidentally. The owner had the land; he needs the work; he needs the workers; the workers need the work; they don't have any money; so he more or less takes them and shares the crops. So that's how sharecropping got started.

But anyway, the point is that if you look at how one can go from Anniston, Alabama, where I think they originated—what little bit I can put together says that's where it was—there is the Tennessee River that leads up into Tennessee from Alabama. And I remember the old people saying that they remembered the army coming down the river, the Union army coming down the river, so—.

Wilmot: You “remember the old people.” Who is that?

Bragg: When I say remember the old people, I remember my father's brother saying that he remembered the old people saying that. So it's kind of hearsay, but you have to remember all these clues. There's not much of a paper trail, you see, that's why it's difficult. Anyway, I'm encouraged that there is another alley, avenue rather, that hasn't been exhausted yet that has promise. So, knock on wood [knocks on table] it may be that it turns out that I got lucky. So that's the saga, or that's a chapter of this saga.

Wilmot: That's how this is going, it's an ongoing thing.

Bragg: Ongoing saga.

Wilmot: I'm wondering if we can turn a bit to talk about your time in the post of faculty assistant to the chancellor.

Bragg: It turned out it was to the vice chancellor. By the time I got the job, it was the vice chancellor.

Wilmot: When did you take that post, what years did you hold that post?

Bragg: God, I don't remember, but it must have been when I got back from being in Washington, which was '81, '82 I guess, was the year I spent at the DOE in Washington. So it was probably '82 or '83, somewhere around there.

Wilmot: Okay. How did you come to have that post?

Bragg: The office was created by Michael Heyman, Mike Heyman, who was the chancellor at the time it was created. And the purpose was to ensure basically, not so much affirmative action, but really equal opportunity. The philosophy behind the job was to

make sure that at least departments, when they had a chance to hire someone, actually did try to afford equal opportunity. Not so much preferential treatment, but equal opportunity, which was—Berkeley was no different from any other place in that sense, that the culture was that white universities by and large, white colleges by and large didn't hire black faculty, or Jews for that matter, going back further. And that being the case, the existence of the affirmative action laws now spills over into academic hiring. And so we've got to have a mechanism for implementing this that's relatively painless, but at least effective. And there were activists around the campus, people like Olly Wilson who was on the music faculty—names escape me at the moment, but Olly Wilson, Rodney Reed, who was in education, the guy, faculty member in anthropology whose name right now escapes me, it will come.

Wilmot: Anthropology, was it Bill—? Anthropology or sociology?

Bragg: Anthropology.

Bragg: But anyway, it will come to me. He was an expert on Ethiopia, places like that. Not [John] Ogbu, who is maybe still around, but—a black guy. London School of Economics, I remember him for the colorful gowns that he wore, regalia at ceremonies. And the name will come to me sooner or later. [William Shack]

But anyway, the idea was that these were people that, because of their academic stature, Mike Heyman, being a guy who was sort of out there, in the forefront—

Wilmot: What do you mean when you say out there in the forefront?

Bragg: He was pro-affirmative action. He really would like to do something, and so he had, I guess sort of had like a kitchen cabinet for a while. I wasn't privy to that, of course. But he consulted these people, and out of this came the idea of setting up a function in his office to monitor hiring practices, hiring activities, and I think Rodney Reed was perhaps the first one. He was on more or less a first-name basis with Mike Heyman, and had a special assignment, created the guts of the whole office, which had a one-person staff and a very small budget. What evolved over time was the office that I finally got to after two or three people previous to myself had held it. At first was a job that got passed on from one black faculty member to another, the basic requirements I guess being, first of all being senior enough, that is, full professor, and, I'm not sure this was ever spoken, but the notion being that you had to be essentially comfortable that nobody could snow you.

Wilmot: What does that mean?

Bragg: Snow means bully or otherwise intimidate you, because you are afraid you will do something wrong because you are black.

Wilmot: How do you get to feel comfortable, how does one get to feel comfortable in the university environment?

Bragg: Well, one thing is you come in with good credentials, and you don't believe you're inferior to anybody. At least that's the way I felt about it. Well, also you had to worry about tenure, now, which means that if you're not a full professor, there's still another

rung at least that you have to worry about. So that means that you really shouldn't put an associate professor in there. If he doesn't have enough rank, after all, he is going to be having an input, he's behind the scenes, but he's part of a chain. And all those things come to saying, well, we really need senior black faculty in this job, and people who more or less have some confidence, that they're not afraid to stick their neck out. Not that they ever actually do so, because they work through, as part of the advisory chain. Nevertheless, it's understood that somehow, to be able to stand your ground is probably going to be useful.

Well, by the time I inherited the job from Reginald Jones, who had been I guess the chair at Afro-American Studies—Bill Shack was the guy whose name I had forgotten. Bill and I guess Olly Wilson had created most of the programs that the office had. The major function, or the daily function was to participate in the personnel actions involving faculty, not staff, and that meant from hiring to promotion to discharge or whatever. The idea was to develop standardized procedures, which was done, so that departments were compelled to do the right thing. They at first, of course, didn't like it, because it seemed to be onerous, unnecessary details, but you can't always trust people to do the right thing, so you have to put in safeguards that at least pushed people in the right direction. You can still circumvent almost any law.

What it meant was that if you are going to hire a faculty for a position, first of all you have to advertise the position so anybody who might be able fill the bill can see it. You don't hide the fact that there's a job opening, which means it has to be advertised in places where it's likely to be seen. Second, the ad should be specific, which means that you don't make it so vague that you can pick anybody you happen to like. In other words, say what you really are looking for, and not just fishing that position, because all too often people have been known to ignore the market and pick somebody they want. And not that there is anything basically wrong with that, but the reason why you need to be specific is on occasion it turns out that you may think you wanted "A," but "B" is available, it turns out "B" is better than "A." So if you had just gone ahead and hired "A," you would have made a mistake. So it helps, those rules do make sense. So that you had to be specific in what your requirements are.

Then you had to advertise in time that people could respond. You don't wait until the last minute and say, "Here's a job," and Joe Blow over there who is ready and willing for your job runs in with his application. You give plenty of time so that a person could respond.

Then a list of the persons who applied, whether they were considered or not, the total list of all the applicants—and for each one, the criterion for what was called "deselection," not selected. I saw some rather snide memoranda in this office which I took to be a kind of racist, challenging the word "deselection," it turned out it was perfectly good English. But the implication was these bloods in the office there don't have, don't speak good English, that's the way I interpreted it. Well, why even bring it up?

But the criteria for—

Wilmot: I'm not sure I understand what you just said.

- Bragg: Oh, I just said this, the instructions, how to make out the form, require you to say what criteria were used for deselection. Why challenge the word "deselection" unless you feel that the person who wrote this requirement is ignorant? And everybody knew that the people who were running that office were black. Well, I don't think I'm hypersensitive about that. I think that particular source was saying, "Well, you've got a bunch of black people in there running this office."
- Wilmot: Who was that source?
- Bragg: Oh, I don't know. I might have known at one time. But the point is that there are all kinds of reasons why people didn't like to do all of this.
- Wilmot: When you said, "Why people didn't like to do this," you mean the different departments did not like to engage in this work of—?
- Bragg: No, departments at that time liked to just do what they damn pleased. And to some extent, I don't have a real problem with that, except equal opportunity. That's the part I have a problem with, and that was the issue. All the other regulations are pretty much covered by [laughs] what you could do anyway. It's the other agenda that's the issue here. They could have hired minorities all along, they just didn't! There's nothing in the laws that say you shouldn't hire them, they just didn't! So the point was to set in place a procedure that required at least careful consideration of minority applicants.
- Wilmot: I just want to stop and pause for a minute there and just think about that, what you just said, that they could have hired all along, they just didn't.
- Bragg: Well, sure!
- Wilmot: And to what do you attribute that?
- Bragg: It just wasn't done. Let's put it this way. Well, the one word that sums it up is racism.
- Wilmot: Right.
- Bragg: Now, if you want a lot more music, I can do that, but racism pretty much covers it. And we can go into tons, and tons, and tons of evidence.
- Wilmot: Before we continue with what you were saying, I want to ask you the other component of this question which is, my understanding is that a lot of these kind of hiring decisions and just the way you know the lay of the land occurs through a social kind of knowing, social networks.
- Bragg: Yes. That and old boy, which amounts to almost the same thing.
- Wilmot: Interesting.
- Bragg: Yes. For example, you'll probably find that—well, for example, the law school pretty much said they wouldn't hire anybody who hadn't come from a certain limited number of law schools. Which said that, I don't care how bright you are, if you didn't come from one of those schools, they weren't going to hire you. Now they may have changed, but I

don't think that's written down in—emblazoned in a [laughs] big casting at the door. But basically, that was the attitude. And in general, that's the attitude! It probably has not changed much to this day.

Now, there are good reasons why on the whole that is probably a self-defining procedure. In the way faculty are recruited, it almost comes down to that, and when I get on, I'll show why that's the case. Having disposed of the people who were not competitive, didn't meet some of the basic criteria, then you just don't consider them anymore, because they don't satisfy the basic criteria. But of those who did, why weren't they selected? Well, it comes down to—

Wilmot: You mean those persons of color who—?

Bragg: Or anybody. See, most people who applied were always white. Very rarely—most of those searches didn't have any black candidates in them anyway. Nevertheless, you had to go through this procedure. There aren't that many black people competitive for faculty positions at major research universities, to this day. And by competitive, I'll explain what I mean, you'll see what I mean.

The list that you finally come up with is a list of people, we'll call this the short list, any one of whom would fit the basic criteria. You say you want this, that, that, that, and that. Every person on there, the short list, will fit those criteria, which meant that in principle, any one of them you would accept. But the question is, you only accept one, and now you have to make a priority and say—and this is done in the department search committee—it looks at the fallout and then makes the recommendation to the faculty of the department, "Here's what we think of the candidates who were available." And there is a vote taken, and now this wish list with priorities is submitted and an offer goes out to number one. The recommendation goes up through the—from the chair to the dean, to the provost, at which point an appropriate letter is written for the department.

The idea is that there are all kinds of systems for hiring people. One of them was the British system, where if the candidate wasn't related to anybody prestigious that you knew, hadn't gone to Princeton, or to Oxford, or at least Cambridge, and wasn't well-to-do, and didn't ride to the hounds, well, he obviously was not competitive, or couldn't write poetry. [laughs] That was the British system. The people who survived this would get the job in England, and people who didn't went off to govern India, [laughs] which is where the money came from. But the point was that as long as you got the right people in the right job, everything was okay. Well, it might turn out that number one won't take the job, so you drop down to number two, and so on. Already agreed that any one of those you'd accept. It may turn out that none of them, nobody answers, in which case you've made a mistake. There's a funny story in *Parkinson's Law* about how you select people for important jobs, which I don't think is—if you haven't read *Parkinson's Law* it's very funny, and I'll tell it, it'll take but a minute.

The Chinese system was a little bit different. The idea was you never really advertise the job, because the person who should have the job would save face if he just responded to an ad, so you had to get somebody to go and ask him if he was willing to accept. It was very roundabout, but that worked as well.

Wilmot: The person would save face, or—?

Bragg: He would lose face. You wouldn't just, you wouldn't answer an ad, nobody of any consequence would answer an ad. You would lose face.

But the system that seemed to be best was to be able to write an ad such that it was so clear and so exact that only one person would answer, and that person was exactly the person that you wanted. And if you wrote it a little bit too loose, you would get too many recipients. If it was too strict, well, you didn't get any. If you did it just, right only one person would apply, and that's exactly the person you wanted.

I said *Parkinson's Law* is a funny essay. Well, the question is, well, suppose despite all that, you actually did get two candidates, [laughs] what do you do then? Well, it said you point to the secretary and say, "Which one?" She says, "That one." Sex appeal. [laughs] Anyway, back to our story. If you haven't read *Parkinson's Law*, it is funny!

Wilmot: Okay.

Bragg: The point at which affirmative action comes in is when you get down to the short list. Up until now everything, it doesn't matter who it is. But if a minority who makes the short list, which means this person is acceptable, and your department has no minority faculty, and even considering the proportion of such people who are available you still don't have one, then you invoke the affirmative action. Since any of them will work anyway, pick the minority. Well, people didn't really like that.

Wilmot: People? You mean—?

Bragg: Departments didn't really like it. And in hindsight, to this day I doubt it if the minority faculty at Berkeley is any more than 2 percent, which is what it was when I was there. So despite all those measures—it put people on their toes, probably it made departments a little bit more careful generally. But in terms of the number of minorities who got hired, I'm not sure it made a heck of a lot of difference. And in terms of the number of—

Wilmot: Why do you think that is?

Bragg: Availability. There's a tendency among us to belittle the old saw of, "Well, I could hire one if I could find one." The trouble with that, when applied to a research university, is that the criteria that are set up in the first place more or less rule you out before you apply. I'll go at it this way. Usually in the—let's take the humanities and social sciences: the criteria in terms of the quality of the dissertation the person has had to write, the papers they've written and stuff like that, virtually require that they had a mentor in a major university in the first place. If you're coming from Podunk State U. which doesn't have a prestigious faculty, doesn't have a high, quote, "academic admissions standards" and so on, the chances that you're going to get the kind of mentoring, if you happen to slip through the cracks, and produce those papers that look good to the faculty at a research university, are very slim. So in general, you may be extremely bright and promising, but you won't look that way on paper. So it sort of weeds you out before you apply, and you have to go in some other way and establish yourself in order to get in the door. But to come in at the bottom like that, coming from a typical environment that minorities would come from, the chances are very slim that you're going to get hired in at the bottom.

Wilmot: So you're locating this in access to higher education.

Bragg: I'm saying that access to mentoring in a research environment, and I'm not talking about the state colleges, that maybe is different, but I'm talking about Berkeley, that's where I was. Berkeley, if you don't do research at Berkeley, then you don't belong there, which means that you've got to have a research background. And that means that by and large you're going to do better if you're in a situation that has better facilities, more prestigious faculty that know where the frontier is and things like that. So it sort of makes it very difficult for minorities to look good in this competition at the lower ranks.

Now, that led to Bill Shack's creation of one of several programs that the office had. And that was the chancellor's minority postdoctoral fellowship program, which said, "Okay, we recognize that. That by and large, two people, even coming from the same school, one, white, is more likely to have had a little bit more push, a little bit more recognition, got the thesis done a little bit quicker, whatever, and one is not going to look as good but has promise. Well, what we want to do is bring them in, let them work for a year or two with prestigious faculty where they will get exposure, will get a little bit of fine tuning if that's necessary, in other words, give them a leg up, give them a little chance. And that should then help them to become competitive for the kinds of people that we want to hire. And hopefully out of this program we will hire some of these people."

Wilmot: It's interesting to me also to hear the emphasis on working with prestigious faculty and mentoring as *entrée*.

Bragg: Well, in general, there are cases of—I don't know about the humanities and social sciences, but for the most part people who have managed to do outstanding—there are exceptions, of course—but if you think of the geniuses who come along, they've usually come from middle-class families, and they're not poor, and their parents have been fairly successful, maybe not in the same field even, but they already have the things that make for independence. You're not worried about tomorrow, how you're going to make a living, things like that. There have been a few exceptions, but maybe—there's one experiment that I can't remember now, that was poor beginning and whatnot, but by and large, thinking back to Europe and coming up to World War II, Einstein was from a middle-class family, Newton was a college graduate, mathematics at Cambridge. You can go right down the list, they all lived pretty good before they went to school.

It would be a rare occasion when they didn't go to a prestigious university as well. So the chances are just much better, all things considered, have more accomplished teachers and better facilities. And the environment is already pushing you. It doesn't say you can't do it, but just means it's harder if you don't have that.

At any rate, that program brought in about four candidates, four recipients a year, I think renewable for two or three years. Paid a good stipend. It had a modest success placing people in other campuses of the University of California. [laughs] Not too well at Berkeley.

Wilmot: Was Berkeley's campus more resistant?

Bragg: Well, Berkeley considers itself the Harvard and the Stanford and the MIT of the university community, and so my—well, the fact was that many of the faculty were who considered to do the mentoring when I was there treated these postdocs as if they were just another postdoc. In other words, the kind of mentoring they were supposed to do they never did, really, that's my impression. So it was a good idea, the program had good—it was a good program, and I say, it was fairly successful in making people look very good to other campuses.

I remember, we had a guy in history, French history, I'm sorry, I guess he was in French. Is that right? Yes, the French department, who is now a full professor at Santa Cruz. I don't think there would have been any problem accommodating him at Berkeley, but it didn't happen. Other universities not too different from Berkeley found many of these people good. But Berkeley wasn't all that keen on doing it. They would participate in the program, but when the crunch came—.

Oh, there was one other feature, and that was the Targets of Opportunity Program. Now, that wasn't new really; it always existed. It simply meant this: let's suppose that department X discovers there's a rare bird out there who is going to make all of the difference in the world in the quality of that department. You don't have to wait until you have a vacancy to get him or her. In a normal course of events, in order to hire a person you have to have a vacancy. And that's determined by your department plan as approved by the dean and the provost and so on, which more or less budgets for—the state has it in the budget. So you don't just hire somebody because you'd like to have them; you have to have permission to hire, and it has to be part of a plan, normally. But if some unusual event happens, there's a guy out there that you just know, "We've got to have this guy!" We're willing, in effect, to mortgage our next vacancy against, acquiring this person. Then you state the case in that way and go out to get him.

For example, there is a guy who is now a Nobel Prize winner at Stanford who was doing some work at Livermore that was so good that it was pretty clear that this guy is so outstanding, any physics department who has theoreticians ought to have him. Well, Stanford got him. Well, he just got the Nobel Prize last year, I forget his name now. But they knew, as everybody else knew, that he was going to be a Nobelist, so they found some money and got him. Berkeley tried to get him, he just wouldn't come. Probably didn't offer him enough money, or some other reason. But everybody went out to get him. So I'm saying that the targets of opportunity always existed.

In this case, the argument was, well, that having a minority is, that's a rare bird too, so why not use it in that connection. Well, the department said, "Yes, we'll be glad to do that, but we don't want to mortgage that other position." See, the idea is that your plan that you had set up is going to be thrown off if he doesn't happen to fit that vacancy that you thought—the next vacancy that you thought would come along. So although the targets of opportunity was there all along, very few departments saw fit to do that.

Now, what the chancellor probably flirted with, and I'm not sure about this, was well, let it be known that if they did take this step, they were not likely to suffer too much. By suffer I mean that they would not be denied the replacement that would normally come about—

Wilmot: They wouldn't be mortgaging off their chance.

Bragg: Yes.

The trouble with that is if you did that, that just in a way opened the floodgates, so I don't think it was ever made a matter of policy. Anyway, so we had that program, which was the Chancellor's Minority Postdoctoral Fellowship program. We had a distinguished something or other professorship program where for the same reason, somebody who might look good but you wanted to bring him on campus and let him or her give lectures for a while, and people get to know him and like him and so on, and maybe hire that person. It wasn't just to enrich the intellectual experience of the campus, but to bring minorities on campus that had a chance of looking good. Bernie Gifford was brought in that way. Bernie Gifford became the dean of the education faculty. He had been at Rochester, he was an outstanding guy. As a result of the impression he made on the campus he was actually hired as the dean of the School of Education. And he didn't even have tenure, he wasn't even given a faculty appointment. He eventually got one, but he was just that good. So, some people came in that way. Most of the department wanted to bring in prestigious white people, but you were pretty—well, we had control of that, so that rarely happened.

Wilmot: When you say "we," who do you mean?

Bragg: That office. That wasn't the purpose of the—giving them—everybody wanted extra money, but that wasn't the issue, so—. At any rate, there was that, and we had a little bit of money for, say, people who had to travel and didn't have any grant money to travel on. It's important to get out to professional society meetings, so we might help them out with the travel money. There was one professor who had these huge paintings, I've got one on my wall back there. [laughs] It was never cheap for her to go and show her stuff, so she would always come and ask for money to help ship her paintings to wherever she was getting shown.

Wilmot: She was an artist?

Bragg: Yes, painter, yes. But anyway, that might have been another program. It was an interesting exercise in seeing the inner workings of the university. As Reg[inald] Jones once put it, "You know, they do anything they damn please." To a large extent—well, let me back up. I'm not sure I want to say that, because I don't recall any violation of any rules that were set down.

In a way the thing kind of defined itself, in that once you make the rules, then you're going to more or less define who is going to satisfy the rules, and the rules are made in your own image and likeness. So for minorities it kept people on their toes, and certainly those people who had the fellowships and whatnot, they benefit from those things. And I'm not sure always it would be a good idea for people who are invited to come to Berkeley, for that matter.

Wilmot: Because?

Bragg: Well—how to put this? Well, take a guy like—I'm trying to think of his name now, in the French department, he got tenure much faster at Santa Cruz than I think he would have ever gotten at Berkeley.

Wilmot: So you're saying because it was a hostile environment, so it might have been better for people to just not come?

Bragg: Well, not come—it depends on when you come. Now, let's go back, there are other kinds of—the tenure process is fairly complex. And one of the—it involves a number of kinds of committees that—we're not talking about hiring now, but we're talking about tenure, that is, getting promoted to associate professor or above. Associate professor or above is to make tenure at Berkeley. And that means you're virtually unfireable, except for if you shoot somebody or something like that, and then you'd have to get convicted—[laughs] of murder, say.

But you've got a committee that looks at your academic qualifications. That is more or less within your own discipline, your peers. Then you've got a budget committee, and the committee of the budget looks at—at a certain time, only so many people are going to be tenured. The university does operate within certain financial constraints. And although there is a certain amount of elasticity in the budget, you can't just go hog-wild and hire people, or rather promote people to tenure just because you think it would be nice. And also, at the level say, of associate professor, you've got to say, "Well, this person is just, as associate professor in art history, as this one is in anthropology." So you've got to equate apples and mules. I'm not sure it's ever proven that these committees are wise, [laughs] but they do exist, and that's one of them that you have to go through. So the tenure process on all of these committees operate in secret. So that—I'm not sure if the minutes of these meetings that—maybe they don't operate. I've been on them, I can't remember, but maybe there was some kind of a record. But it doesn't mean that the record really reflects everything that got said.

I remember sitting on one committee where the question was, the department wanted to tenure a certain person. One reason was because if they didn't, pretty soon he was going to leave, and they didn't want to lose him. And another one, one of the people on the budget committee said, "Well, there's no great rush and he's not leaving, where can he go to—" More or less, where can he go to beat Berkeley? And of course, my attitude was wait a minute now, Berkeley isn't that great, there are other places where he might go.

But the point is that there are things that go on in budget committees that don't show up outside. And there's a place where all kinds of insidious attitudes can play a role that you never know about. I've been on committees like that, so I'm aware that that's the case.

Nevertheless, getting back to the office, it was interesting. I learned a lot about how the university operates. On the whole, I'd say it's not a bad system. From talking with people who had been at other universities, certainly the HBCUs, the difference is like night and day.

Wilmot: In terms of?

Bragg: The level of democracy, for example. If you read, talked to people who have taught at HBCUs, the word Byzantine is the best description I can give of [laughs] the administration. Top down, God is there, and everybody else is [demonstrates with his hands] more or less—. Well, I told you the story of Warren Henry and his requisition

that didn't get funded. Well, that was fairly common, I told that story to guys who taught at [HBCUs], and they said "Yes, sure, I can understand that."

Don't get me wrong, I'm not out to make fun or denigrate, but to point out really the difficulty under which faculty in HBCUs very often labor. There's one other difficulty too, and that is the level of preparation of students to come to them. They have to work so hard often to overcome the deficiencies that they've had from inferior high schools.

Wilmot: So when you brought up the comparison of the HBCUs, were you referring, were you comparing the different environments that faculty might find, or were you comparing the committee structure, or—?

Bragg: Oh, no, the committee structure probably, that structure probably didn't even exist.

Wilmot: I'm confused about that comparison in that context.

Bragg: I'm sorry, I more or less jumped out of that right then. [laughter]

Well, let's see. I would say that my experience in that office was that I probably spent more time reviewing cases than I should have. Reg Jones did the same job in probably half the time. When it came to the hiring process, so little of it resulted in minority hiring that I'm not sure it made that much difference.

Wilmot: Do you remember particular departments where there were instances that you do recall having impact?

Bragg: No. Off-hand, no. No, the answer's no.

What I'm thinking is that I made it a point to read this stuff thoroughly, to occasionally talk to people. There are other cases I might add that came up having to do not only with the hiring but the tenure process itself. You understand that they had a Rule of—I think they called it a "Rule of Eight." An assistant professor hired at Berkeley has at most eight years to make tenure. At the end of six years, if you still haven't made tenure, you're told that you've got two years to look for another job. They are not going to tenure you. So if you haven't made tenure in six years, you essentially are out. And the reason for that is, you don't let people hang around forever if they're not going to do something. I think that's fair. Most people don't take that long, but a few do. But at the halfway point, after four years, the chair of the department has to appoint a committee that reviews the candidate's progress and advises them about where he stands and what his chances are and what he has to do.

And occasionally in that job I had little to do, little contact personally with the departments. But since all the paperwork came through my office, and the provost expects me to give good advice and I'm in contact with the provost quite a lot and make recommendations. Very often my verbatim recommendations come out as memoranda written by the provost. So in that sense you—whether it was minorities or not, you still look at the cases that involve upgrading.

So it was an interesting job, and as I say, I learned a lot about how that university works. And I'd say it would be a model of how a good university would operate; I'd doubt if

there were any better ones than that. You can't wheel and deal as much as you could, say at Stanford, a private school, doesn't have the legislature looking over its back to tell them what to do.

Wilmot: With this post you mentioned that there was some money that would assist people in traveling or assist faculty who were working on different projects, but—

Bragg: Not much, but some.

Wilmot: And were there funds that were apportioned to that office for the purpose of helping to subsidize department budgets when it came to hiring minorities and faculty of color?

Bragg: No, there was a certain amount of—and my memory is hazy now, but some money went to the mentor in support of the mentoring activity with the fellows, I'm talking about new hire. But as far as the hires, new hires are concerned, I don't think so.

Wilmot: I guess I'm asking you, you mentioned that there were a few occasions, though it never became policy or formal, but there were a few occasions when you could assure a department that if they hired a faculty person of color that they would still have—that they would have basically not have mortgaged their—

Bragg: No, I couldn't do that. If I said that, I misspoke.

Wilmot: I might have misheard you.

Bragg: Yes. No, I couldn't do that.

Wilmot: But I guess what I'm trying to get at is, was your office ever given those kinds of teeth in order to enforce—

Bragg: No, that would have come from the provost.

Wilmot: Okay, I'm sorry if I misunderstood that.

Bragg: No. And I'm sure if I accuse one of them, he'll say I'm lying, he or she. One of them, she's dead.

There were a couple of provosts. Provost for letters and science, and provost for professional schools. Doris Calloway, who is dead now, a wonderful provost. She had been chair of nutrition, outstanding nutritionist. And her bailiwick was engineering, nutrition of course, art practice, just about all the professional schools, public health, you can go right down the line.

Wilmot: Okay.

Bragg: Social work, but not sociology.

Wilmot: Yes, I understand, there is a difference, and that's a very clear distinction there.

Bragg: Yes, they'll tell you in a minute. [laughs]

Wilmot: They'll let you know. [laughs]

Bragg: Len Kuhi was the provost of letters and science at the time when I was there, also a very fine person. They were both outstanding, I thought. Mike had a great staff.

Wilmot: So if those kinds of financial, basically financial incentives were to come, which they formally never did and never would, they would come from the provost level or the chancellor—?

Bragg: No, well, now there I'm on shaky ground.

But at the level of hiring a hotshot like that, in most cases you see, the—. I don't know how that worked, because new faculty coming in typically don't have any money. Now, that might have been part of a package, might have been, in fact in engineering, for example, it might involve a million dollars worth of lab equipment. That person, that particular person might be that important that it's felt that, well, you've got to have a lab, you've got to have some money to operate on until you can get your own money. So in the agreement before you're even hired, that would be part of it. In fact, when I was hired into my department, I didn't get it through the department, I got it through the Lawrence Berkeley Lab, but when I was hired in one I was appointed to the other at the same time. Now, and so a lot of times in engineering that would be the way you would work. But if it wasn't, it still would be part of—the dean would get involved with the department in things like that. So it's not just done in isolation.

Wilmot: Okay. I want to ask you, you mentioned that Chancellor Heyman had a great staff.

Bragg: By staff I mean his crew. He had a good vice chancellor, good provosts, and generally I'd say the staff was good. My take on the chancellor and the vice chancellor was that Mike was the guy out front with great personality and the vice chancellor, Rod Park—Mike would give away the store, and then when you go to collect it, Park would take it back. [chuckles]

Wilmot: Hmm, interesting. Well, I guess and my question, that kind of gets to my question, but basically I'm wondering how did the chancellor's office stand behind these efforts that you were making in this post.

Bragg: They were doing as much as they could do. You see, you can't—and that's one of the differences between HBCUs and a place like Berkeley, for example. The chancellor can't say "Hire this person." Basically, it comes down to having a strong Academic Senate, which Berkeley has. You can't dictate to—you can tell them what they can't do, but you can't tell them what they must do.

Wilmot: And I think that's the key of this, that's the crux.

Bragg: You can't say, "Here's the Great God Jehovah, hire him." But if they come along with Adolf Hitler and say, put him in sociology, you say, "No, you won't either." [laughter]

Wilmot: So, and in this post did you feel that you were supported by the chancellor's office in your efforts to encourage the different departments to follow certain criteria in their hiring and tenure practices?

- Bragg: I felt that I did the job of that office. It was not my job to go out and proselytize. That's what the chancellor is supposed to do.
- Wilmot: So did the chancellor support you in doing this work?
- Bragg: The chancellor supported—the answer is yes. But it came through the provost. See, somehow it started out with this office reported to the chancellor. But over time it got reported to the vice chancellor. But I don't think there was any slackening of support as a result of that.
- Wilmot: That's good to hear, that's interesting.
- Bragg: And it's pretty much the same now.
- Wilmot: So the people who preceded you in this office were Olly Wilson and Reginald Jones?
- Bragg: Well, and Bill Shack.
- Wilmot: And Bill Shack.
- Bragg: And Rodney Reed.
- Wilmot: And Rodney Reed. What kind of communication did you have with a member or members of that group about how to do this work?
- Bragg: We—well, first of all, I'm not sure exactly how I got picked, but I guess because I was kind of available. I was senior enough, and I was kind of available. I was a full professor, had been a department chair—at that time, I think there was only maybe one guy in the architecture who had been a department chair, and I think I was probably the first black chair they had—I'm close to retirement, and probably all those factors entered into it. I don't know who approached me, probably Reg. But anyway, I knew all of them, you see. We weren't that many, maybe thirty at the most.
- And some of whom we were in fairly good contact. Bill Shack was from Chicago, I knew him. I didn't know him in Chicago, but I knew people he knew, so we kind of knew each other. Olly was the guy that everybody knew. We used to meet once a month, and maybe they still do, in the Faculty Club, and just rap, and issues came up for discussion. So from attending those meetings I pretty much knew everybody who came regularly. Some never came. But those who came would be people like what I've just said. So, I'd say when questions came up, it was a simple matter of getting on the phone and calling Reg or Bill Shack or Olly or Rodney. We were all on the same page pretty much; we all pretty much had very similar attitudes and ideas. And they had pretty much set up the whole routine when I got there, so all I had to do was just kind of follow it.
- Wilmot: Were there any instances that stand out in your mind?
- Bragg: You mean about what happened while I was in the office?

Wilmot: Yes, I'm sorry I didn't say that as directly as I could have. Were there any cases or instances that stand out in your mind that you would like to speak to that would be kind of illuminating to show how the institution dealt with the issue of recruiting faculty of color, or keeping faculty of color?

Bragg: Well, there was one where a person who thought it was a shoo-in. At a meeting that was being attended by the vice chancellor, he more or less intimated that he was going to be a member of the faculty, and he wasn't. It wasn't cool, as Reg said, it wasn't too cool.

Wilmot: Now, was that a person of color?

Bragg: Yes. He was an epidemiologist. I don't remember his name, so I can't call it, but boy, it was a—. There had been enough talk about targets of opportunity that it could very easily have been evoked. It just wasn't, and I'm not sure if his speaking out of turn played a role or what. I don't think they ever had a black epidemiologist in the School of Public Health, but I'm not sure what the reason for that was.

Another time we did have one success. Apparently he wasn't black, but he was a minority. It wasn't just blacks, it was minorities.

Wilmot: Okay, and that included Asians, Latino—

Bragg: Hispanics, yes.

Wilmot: —and African Americans?

Bragg: Asians were kind of a funny case, because there are all kinds of Asians. There are the Asians who are descended from the miners that came to California to work the gold mines, who have been the victims of discrimination. And there are Asians who have just come over from Hong Kong, who haven't been victims at all. And my personal feeling was that they are different. The tendency is to take advantage of any opportunity that goes with being Asian, no matter which class you come from. But I thought one deserved the advantage, and the other did not. Similarly with Africans. I found that counting Africans as African Americans, as minorities, is a bit much, although the case is not as clear-cut there, because they're still black, and when you see a guy out there who is black, he still gets the instantaneous label on him. So his case is not as—that's not as clear-cut as the case of the guy who can barely speak English who has just come over from Hong Kong.

Now, I know I'm sounding racist, but go ahead. I'll be willing to debate that point here.

Wilmot: Actually, I just wanted to return to that story of the one person who you said—he was not African American, but he was a person of color, or she was a person of color.

Bragg: It was a he. He was a good case. He went through the Chancellor's Minority Postdoctoral Fellowship program. He got a follow-on, finished the draft of his book, I guess it was, and he got hired into sociology, and he's probably a full professor by now. He did a study of gangs in L.A. He was Spanish, Mexican, Polish. And he did a sort of an outstanding study, had gone and lived and participated in gangs. He was a case of—

he was a good success story, because he did come through that program, and if he had come out directly he would never have made it, I don't think.

Wilmot: What do you think of, when you think of the different programs that were under the umbrella of your office—and I'm thinking of the Minority Postdoctoral Fellowship program—

Bragg: Incidentally, that program got extended universitywide. Despite all the negative stuff I've said, it was innovative. It did have some immediate successes. There was a hire into, of all places, the astronomy department right off the bat. I forget, there were one or two others that immediately were very successful. And not only that, but it continued to produce people who were competitive for faculty positions at other outstanding universities. So, even though we didn't hire all of them at Berkeley by any means, the system did benefit I think, to the extent that it got picked up by the University of California systemwide. Then eventually I think Berkeley's one just kind of got merged into that. But at any given time I think there would have been about fifteen or twenty of those on different campuses.

Wilmot: Having said that, which strategy that originated out of that office would you say was the most successful, met with the most success in the institution?

Bragg: I really couldn't say.

Wilmot: And when I say strategy—

Bragg: I know. Out of all these programs and things, which one of them did any good or did the most good? I'd say that probably the Minority Postdoctoral Fellowship program.

Wilmot: And which met with the least success?

Bragg: Well, the rest of them, it's kind of hard to evaluate, because they had different purposes. The visiting scholar kind of thing, how many hires came out of that I don't know. But you don't know—if you measure success in terms of Berkeley hires, that's one thing. But the book is never closed on that, you see. We could have had a person come to Berkeley in that program, and then go down to Riverside and get a much lighter teaching load, write papers like crazy, and all of a sudden, "My God, this guy's on fire! Hire him back to Berkeley!" So you're never quite sure, you're never quite sure that you've not done as well. You're quite sure you haven't been outstanding, [laughs] because that shows right away.

Wilmot: That's very interesting, though. There's this whole school of outcome evaluation and these kinds of outcomes are actually hard to track.

Bragg: Just like the intelligence tests, all those particular things tell you is how well you're going to do in the first year. That's about all it can tell you.

Wilmot: I have a couple more questions for today because I see you tugging on your arm, so I don't want to tire you out.

Bragg: Speak. No, no, no, just stretching, that's all. Speak.

Wilmot: Okay. Well, you mentioned the way that committees operate and how within the context of the committee, you know, different things go on that aren't really formally recorded, which impact the careers of colleagues and academics at the institution, at the University of California. And what that raised for me is this interesting question about what kind of entrée do African American faculty have to these committees that make decisions around things such as their colleagues primarily?

Bragg: Probably now it's a lot different from what it was when I first joined.

Wilmot: Well, could you state just how they're how different?

Bragg: The reason is this: there is a culture which evolves, which is sort of old boy, in not exactly the stereotypical sense, in that they're all white. But over time, once you come into the faculty you invariably wind up on committees, and not all of them are in your department. There are many which are campuswide, which are open, there's nothing secret about them, anybody could—not anybody, but they're not hidden from anybody. And over time I've served on the committee on public policy, committee on relations with schools, several committees of the Academic Senate. [interruption] The most powerful one, of course, is the committee of the budget. That's equating horses and apples. But—[phone interruption]

When we first showed up—the black presence, the minority presence first showed up, the committee on committees rarely placed a minority on any important sitting committee. See, there's a committee on committees, and they are the most powerful people on the campus, having been around the longest and all that, and everybody knows them. There's a certain amount of power you evolve by virtue of your associations. So in the very beginning we never wound up on important faculty committees. But by now that's changed. So to a large extent I would say that those people who have survived, who have essentially continued, have become more mainstream in terms of the campus operations. So some of the things that used to be, I'd say unavailable, I would say that's probably not anywhere near as much of a problem today as it was when I first joined.

Wilmot: What was it like when you first joined?

Bragg: Well, what I meant was that I would never have been put on the committee of the budget, for example. Now, some of that has to do with being around the campus long enough to have a feeling for the whole culture. Some of it has to do with, having been a minority, not having been around the [laughs] campus very long, so there's no way you can evolve to that level, you see. So I'm not apologizing for it, I'm merely saying that some of this just has to do with the passage of time.

But as I say, it was quite obvious that important faculty committees, you just didn't get appointed in the very beginning back in the early seventies, for example, or even up into the eighties, probably.

Wilmot: You used this very interesting word just now, you said “survive.”

Bragg: Well, not everybody who got appointed, who came in as an assistant professor, made tenure. People who got involved in things that didn't get them tenure, some of them ill-

advisedly. For example, well, there was one sad case of a woman in, I think it was architecture, who actually brought suit against the university and won it on the grounds that she was discriminated against because her husband was Jewish or something like that. I forget the details, but whatever it was, I hadn't been familiar with that case and she had been counseled by the provost, who was certainly a fair person, to get on with her stuff that the department was looking for and get off of the soapbox. She wouldn't do it, and they didn't tenure her, and she brought suit and she won. It didn't make a big splash in the papers, but she just trashed the very woman who was trying to help her. And I may sound like a traitor to the faculty, but I'll tell you, not all faculty have halos.

Wilmot: I have a question, just to return to that question of committees. And this is a question, again from someone who is new to the institution, and I'm trying to understand how do committees such as a tenure review committee or a hiring search committee, how are they formed?

Bragg: Okay, let me give you an example. Let's take a typical case. Let's say my department. First of all, the department has an academic plan, which is updated every year. It's a five-year plan, typically, which says, here's what the department is all about, it takes stock of where it is now, what it thinks it ought to be, where things are going, anticipates the future and future needs, how many people in what fields, what specific areas, not just we want the most smart people, but concerns, "Well, we're getting kind of old now, all of a sudden in ten years half of our faculty are going to be retired. We're suddenly not going to have any very senior people. So we can't just hire all junior people, we'll have nobody but rookies. So we've got to hire some approaching senior-level people, as well as others to replace them." Things like that are considerations. All that goes into the department's planning, is debated ad nauseam. And all the faculty are encouraged to make inputs to the plan, and share the inputs together, gets together with the faculty and agrees that, "This is our plan."

Wilmot: Right.

Bragg: This goes to the dean's office. So it becomes a part of the dean's plan then. He has to buy into it. If he doesn't particularly like some aspects of it, say you need to have twenty-five people and you only have got twenty now, there's no way you're going to get five people tomorrow. He might give you one or something like that, despite all the retirements and all that.

So the plan then gets massaged and whatnot, and agreed upon. Unless something really dramatic happens, you try to follow that plan, which says that, "In two years Professor X is going to retire, and we'll have a vacancy. So do we want to replace him or not?" By replace I mean in the same field that he's now working, or is that field now just about mined out and it's dead? We just can't fire him, but as soon as he's gone, we're going to get out of that field. So a decision has to be made as to what kind of a person you're going to be hiring. Having done that, then the persons who are closest to that particular technical area are the ones who are required to write up the specs for the kind of person they want to hire. So the search committee then gets composed of people appointed by the chair who will be competent to examine the qualifications of applicants. Typically there will be a student on the committee as well. You may, in some cases, appoint a faculty member, a search committee member from an adjacent department. For example, if it has to do with mechanical properties of materials, you might want to get

somebody from civil engineering to sit on your committee. Or if it's semiconductors, somebody from electrical engineering. But anyway, that's the way the committee gets set up. It can't decide, it merely recommends.

Wilmot: But I think what I'm trying to get at with that question is, you know, just how are African American faculty and staff, how do they appear on committees that make decisions that affect their peers? Specifically around tenure and hiring. Like, how does that occur?

Bragg: Oh, on tenure, that only comes about in a vote of your faculty. You participate because you have a vote and a voice. You don't have any power to overpower anybody, but your vote counts, and you get to speak up. So at the department level you participate in the debate and the vote. And also when it comes to the recommendations for promotion, typically junior faculty don't, are not involved in recommendations for promotion of senior faculty.

Wilmot: Right, that makes sense.

Bragg: But at any rate, there you have occasion to participate in the discussion and the vote. And you have another place when it comes to the committee of the budget. Those are the positive sides. There is an Academic Senate committee on privilege and tenure, which fights the university, or fights, you know, some malodorous, some smelly—

Wilmot: Okay. [laughter] Malodorous.

Bragg: —something goes wrong somewhere, you feel that your rights have been violated in some way, there's a committee on privilege and tenure which is kind of defensive. But there's another route to—but there's an ombudsman before that even.

Wilmot: Okay.

Bragg: And then of course there are direct appeals. You have the right to ask permission, if you're not satisfied with your chair, you want to talk with the dean, you want to talk with the provost, all that is available to you. You may not get anywhere, [laughs] but you can ask for it. I mean, you may not change their minds, but—.

Wilmot: I'm also wondering if there are viable opportunities for African American faculty to make ways for other African American faculty, specifically around issues of tenure, tenure and hiring? So that's kind of where I'm focused.

Bragg: I think no. Let's put it this way. The academic department is an entity which is presumed to be the best authority about that particular function, on the campus. Nobody over in sociology is supposed to be an expert on art.

Wilmot: Okay, I understand what you're saying.

Bragg: So your opinion is right there at the firing line. And you can't do much about—and also, even when it comes to complaints, let's say—

Wilmot: I mean just within your own department. Like, how much can one impact the process?

Bragg: Well, within your own department the best thing you can do there is to ensure that fair standards are employed when decisions are made. For example, in our department, some sub-fields publish a lot more papers than others, it's just in the nature of the beast that that's the way it works out. You have to be sure that you're not applying standards that are irrelevant or discriminatory when a person's case comes up. And in certain fields, in a given year at the level of associate professor you might be expected to publish two or three papers. It takes a while to get them in the pipeline, sometimes they take a year before they'll come out in print. And allowance has to be made for that. But by the time you get up to tenure, you should have papers in the pipeline, and they should be in refereed journals of some stature. There are thousands of journals, but in that particular field there are only a few, you see.

So what you do there, of course, is to look at the case that's presented. Let's suppose a case comes up and says, "Well, we don't think this guy should be tenured because he has not published any papers." Well, if he has not published any papers, then of course, there's no argument. But suppose he has published only a very few. And here is where *The Agile Administrator* comes in. Did you see my book? Well, I can't retrieve my copy, but I had a book which was titled, *The Agile Administrator*, which points out that there are three basic criteria that go into faculty evaluation: teaching, research, and service. And you can take any case, and make it positive. Let's suppose, for example, that it comes out and says, "Well, Professor So-and-So didn't publish anything, any papers, any." If he didn't publish any papers, of course, then that's very difficult. But suppose it's only a few. You say, "Yes, but these are seminal contributions. Every one of these was a landmark paper. How many papers can you publish?" Or suppose he published a lot of them, and you don't like him. "Yes, but they're all bullshit."

So depending [laughs]—I'm being a little bit facetious, but not totally. Depending upon whether it's desired to tenure the person, you can argue the case either way, that either they're trivial, or if you like him, well, then, "He's extraordinarily productive." And the same way with teaching. "Well, the students don't like him, but he's tough, and they really learn." Or, "No, he's not, they shouldn't like him, he's no good." Or service, "Well, you know, we can't expect a man of his productivity to be too involved in community service." See what I mean, you could go either way.

Wilmot: Okay, I want to ask you one last question for today which is about during your time at Berkeley, 1969 to 1987, there was at least two—help me out with one of them, but there was Chancellor Bowker and Chancellor Heyman, and when you arrived —

Bragg: It was Chancellor Heyns, I guess.

Wilmot: Okay. I wanted to just kind of get a sense of how, in your opinion, did the university's approach to recruiting and retaining faculty of color change over that time?

Bragg: Well, it's hard for me to say, because I was hired in '69 when there was—at that time the great bulk of the faculty that were my colleagues were hired within a few years of that. And after that it just sort of flattens off. So it must have been a big push. However, whether it was enthusiastic or not, it was effective in recruiting. And that happened all over the country, incidentally. People who had sort of been out in the backwater or wherever, had not had a chance at a slot in a research university, who were good enough

that they wouldn't embarrass departments. And so that, well, that was the era that I came in with.

Now, the problem with the extraordinary efforts after that was you can't create a person with ten years of experience in five years. So all the people who had a lot of experience are already used up! There weren't that many to put in the pipeline. So now you've got a double whammy in that it takes time to produce people with that level of experience, which translates into publication and stature, stuff like that. And you've got to then go about recruiting people into the fields where they have been reluctant to do so, because there weren't any opportunities. So this means programs like MESA, BESSA, and stuff like that have to begin to operate. So it's not too surprising that nothing dramatic occurred after this first wave. It was just inherent in the historical context in which you found yourself.

Wilmot: Are you saying the institutional encountered kind of a brick wall in terms of the pool of applicants?

Bragg: I'm saying that that was a large factor. The pool of applicants who met the demanding criteria that they had established. It didn't mean that people weren't coming out of college, but you don't come out of college with ten years of experience, for example.

Wilmot: In your opinion then, did attitudes and practices in this area shift over these two decades while you were at Berkeley?

Bragg: I can't really say.

Wilmot: Okay.

Bragg: My—I didn't really get involved in any serious way in this whole thing until I took over that job. In the College of Engineering, I was the black presence in the College of Engineering, from the time I had arrived until I left. On occasion we would bring in, like on one of these programs, we would bring in somebody like Percy Pierre who was the dean of engineering at Howard, or—not somebody like, we did bring him in.

Wilmot: I understand.

Bragg: In fact, he invited me to come and spend a little while at Howard, and I did.

Wilmot: Yes, I remember, we talked about that.

Bragg: Lucius Walker, who replaced him as dean came and spent a few weeks, a week or so at the invitation of the dean of engineering at Berkeley. But the fact is that you can't get over the stringent requirements of producing research publications, if you're not in a situation where you can do that, you're just not going to be competitive. You're not going to get there just because you're promising. There are too many white people who are promising. You just, you can't do that. So it means that—and the trouble with going into the historically black schools is that they didn't have the money, you didn't have the graduate students to help you turn out the papers, so it's a self-fulfilling—it just makes it very difficult, and people who did, technically, who did well, usually were ones who had somehow wound up in industry and been able to produce papers, like me, at IBM or

Bell Labs or places like that. The rare cases where that happened, had a chance in engineering, you see. Once you had the papers, there being such an emphasis on research, the fact that you could give a seminar, a forty-five-minute seminar, as long as you were articulate, people assumed you could teach. You probably wound up to be a lousy teacher! They would forgive a lot of that. But not the research. If you had gone to a situation where there is obsolete or nonexistent equipment, and no infrastructure for that, the technical layer is in particular bad—the other areas, the teaching loads are so bad. Typically it's hard to do any significant research if you're teaching four or five courses a semester. So on either side, you see, that's where the postdoctoral fellowship program was supposed to help out, for all those coming out of school, newly minted, who already have the research spirit and all that, but haven't got mired into five-course teaching loads.

Wilmot: Okay. Well, do you have more words to say today?

Bragg: Nope. I know I've painted a difficult picture, but—

Wilmot: You haven't painted a difficult picture.

Bragg: —but the reality is that it may have improved a lot, but not that fast. I spent six months working at the Advanced Photon Source with a group headed by Walter Lowe, who is a physics professor at Howard University. Walter had spent about ten years at Bell Labs working, doing research at Bell Labs, had gone to teach at Howard, had been persuaded to come there, and came in with a billion dollar grant to set up a research program at the Advanced Photon Source. He was part of a group of half a dozen orchestrated Ph.D.s that went through Stanford about fifteen years ago. They picked from all over the country, Stanford made a determined effort to turn out a bunch of black Ph.D.s, and they went around and recruited them. They all knew each other, all came out of the same faculty at the same time. And they all wound up in good jobs in places like IBM or Bell Labs or the Jet Propulsion Lab, and they were all very—so they had the chance to go and do research. But they were a special case where the university made a determined effort to do that and didn't tell you. In other words, that didn't continue the next year and the next year and the next year, but these, they were kind of a chosen group.

Well, the point I want to make about Walter Lowe is, Walter in his office had a map of the United States, and he knew where every potential black Ph.D. in the country was. And the number that he could put up there was pretty damn small, for physics, I mean. And of those, not everyone is doing the same thing, you see. Physics has got half a dozen, at least half a dozen sub-fields. So by the time you bring that all down, it turns out that the rate of production in physics for example is just not high, it's small.

Wilmot: The rate of production of Ph.D.s?

Bragg: Yes. So it's—I'm sure it's improving, but it's—[laughs] and I can imagine that all the people who got the dot-com virus, [laughs] it didn't help that everybody went off to do law or become an MBA, or you know, get rich. [laughs] Well, maybe the crash of that is going to be good for science.

Wilmot: We'll see. Biotech maybe, biotech firms.

Bragg: Yes. Well, people are going to have to go to work, which is good.

Wilmot: Let's close for today.

[interruption]

Wilmot: [reopens interview after short break and off-record conversation that seems relevant]
So, I guess my question for you is given your experience in the university and watching the changes that have happened or not happened over the years, what was your response to hearing about Proposition 209, the anti-affirmative action initiative?

Bragg: Now, that's the one spearheaded by Regent [Ward] Connerly. I think it's absolutely asinine, it's ridiculous. And it's ill-considered for some really basic reasons. Affirmative action has always been employed. It just hasn't been employed for the benefit of minorities. Let me go back to the way the federal government used to operate in jobs that involved an interview. You may look good on paper, until you come up for the interview. And they're not obliged to—and this is where minorities up until fairly recently wound up not getting good jobs in the federal government, because they flunked the interview. The easy test was, just look at the color.

I'll tell you a funny story about that. I know a guy whose name was McKerrow. Certainly that doesn't sound basically black; it was not Washington or something like that where you know right away he's practically black. McKerrow happens to have been educated at Tufts somewhere in the East, in Boston or someplace like that, again, not a bastion of black education. Not only that, he was educated in chemical engineering, how many black chemical engineers do you know? So McKerrow doesn't sound like the profile of a black person. He's got a Boston accent, he's got all this white-looking credentials, name, field, university. He applies for a job with the federal government and they want a metallurgist, and they'll take a chemical engineer, to work at Mare Island Naval Shipyards. Well, for some reason they don't require the personal interview. It may be that he had such good qualifications that they hired him sight unseen. [laughs] Well, when he shows up, he takes the job, and he shows up there, they are convinced that something is wrong, "You can't be McKerrow!" [laughs] The good part is that somehow he survived this lack of the—passing the interview test. But the point is that from all I've been able to gather, until very recently, it's like the short list, you could make the short list and never make it, because you just get passed over.

Now, so when it came to admission to universities—let me ask you something. Do you think President Bush—no, you won't answer this question, I won't ask you to answer, but I'll tell you—

Wilmot: Go ahead, you can ask me a question.

Bragg: I don't see how he ever got an MBA at a prestigious university, except he was President Bush's son.

Wilmot: Right.

Bragg: Patty Hearst was a student at Berkeley—Patty Hearst was no genius, but she was a granddaughter of one of the beneficiaries of the university. There are all kinds of

affirmative action going on in admissions to universities. It's nothing new. It just works for the favor of the favored. So I don't have any—it doesn't disturb me if a person who otherwise meets minimum qualifications—to make preferential treatment. They do it for athletes, they do it for musicians, artists, all kinds of special people. Well, there is a shortage of trained black people, minorities. Let them in.

So I don't—and furthermore, I have a problem with deifying the SAT scores. GPA is another matter, that is rather more accurate, I think. But even that has problems. We know enough about the fallibility of SAT scores, the educability, how you can educate to score higher if you've got the money. We also know that they are culturally biased. *The Science and Politics of IQ* is a very good book on this subject if you've not read it. It's funny, too. Lots of examples. For example, you see a picture of a child with a container with a handle on it, and there are words, “pail” and some other words there, and the kid from the country looks at it and he doesn't know these things. But if you had put the word “bucket” in there, he would know. There are all kinds of questions like that that have no real test of—it doesn't test anything.

Wilmot: Hmm, I agree.

Bragg: Mathematics comes closer. There you have to—that speaks directly to your abilities to think analytically and to have background in that area. But so, the SAT score is not sacrosanct, by any means.

Furthermore, the GPAs—I used to serve on a committee of the admissions department at Berkeley. And what we did, what we were asked to do was just to evaluate and make recommendations for awarding four-year full scholarships to the University of California. Now, the reason why the university does this is that the university exists by law to be the repository of knowledge in the state of California, and a source of new knowledge. Which means that you either train citizenry, that's what all the laws—why we have public education. So now you want to make sure that students who come up in California make damn sure they get educated, which means single them out and—it's not a need-based thing. They—just be bright enough. The best of the brightest is what you're after. Well, when you now go and look at how you discover this, it turns out that the criteria usually for admissions involves the A to F requirements—I don't know what they are now, but it used to be a certain number of basic coursework that you had to have taken in order to be regular admissible. And on top of that, have an appropriately high combination of SAT and GPA scores.

Well, when I looked at the people who showed up for the interviews—oh, let me just back up and say that nowadays so many people score good on these, with these criteria, that they outnumber the number of scholarships that are available. So the question is, well, how do you tell amongst all of these outstanding people who should get the awards, since they all look about the same, the numbers are indistinguishable? Well, the idea was, senior faculty should know something about this, because they have been teaching long enough, and they can recognize something that's innate that doesn't really show up in those numbers. Well, what I found was that most of the students who showed up were not—they were rather intelligent robots, which means that—and that's a bit too derogatory. What I mean is that they—it was hard to tell whether they were really that intelligent or not, they were so programmed to study hard and get good grades. Very often they were either faculty children or quickly identified at their high

schools, almost all from middle-class or upper-middle-class neighborhoods. They're told, "Take these courses," the advisors look to the catalog to make sure you take all this, "You've got to look good with public service." So you volunteer and do the work or whatever it is, do volunteer work, in other words show them that you're broad, you're passionate, and whatnot. Everybody is programmed to do all that. And also take AP courses.

Now, by virtue of some rule that I cannot justify, it's possible for a person to have more than a 4.0 grade point average! Now, how can that be when 4.0 is the highest grade you can get for any course? So any score higher than—any GPA higher than 4.0 is ridiculous, and yet it's permitted. In fact, I objected to it and they stopped [laughs] asking me to evaluate students in the state. What I found was that the students were bright, no question about that. They would graduate, they would graduate probably with honors. But if you were looking for the spark, something that would speak to, "This is an unusual individual," they wouldn't necessarily be the highest scoring students on these interviews.

And the example that always occurred to me was that right there in the school of engineering at Berkeley there is a building donated by Bechtel, who was the head of the biggest engineering firm, one of the biggest engineering firms in the world. Built Saudi Arabia, practically! Bechtel couldn't have gotten into Berkeley! I mean, with the way things are done now. And my point is that you make a mistake putting too much emphasis on the SAT and GPA, when there are other qualities that people may possess that in the end are going to do much more for the state than turning out another person who would make a good cog in a machine. Now, mind you, they would all be useful. But the question is, there might be some other people who are equally useful, or even more so.

So I'm not—as I say, my experience with selecting students to be admitted to Berkeley was that the students who got admitted who would complain that some student with a lower SAT or a lower GPA got in ahead of them would make a complaint that somehow that the person admitted was less qualified—it's is not a very strong argument. And then that being the case, minorities who for many reasons don't get a chance to shine as well—AP courses, for example, the counseling, any number of reasons—will do just as well in the long run as the ones who people thought should—. In other words, that regent what's-his-name [Ward Connerly] was totally wrong, and they should never have supported him in that; they should never have banned affirmative action.

Minimum standards, yes. But beyond that—. There's a study made at Harvard by an outgoing president, I forget his name now, but something like the "bend of the river", something like that. Well, he studied the careers of minorities who had been admitted under affirmative action criteria over a long period of time, it turned out that they did just as well as the others. So I think what's his name—?

Wilmot: Ward Connerly.

Bragg: Regent Connerly, he just—it's ridiculous, it shows that there's a latent racism, that he could persuade people to buy into that, and persuade the populace to vote 209, for that matter. So the answer to your question is, yes, I am for affirmative action, and applied intelligently, it's the only way that we're going to make much headway in getting the,

keeping the movement in the direction that we need to go to deal with this issue of residual aspects of racism.

Wilmot: I have a question for you. This is the question I meant to ask you. You said that before you had accepted that post of faculty assistant to the vice chancellor, you had not been so involved in those kind of efforts, but you had known about them and you had a certain opinion. You outlined for me why you think the job was offered to you and where you were at, but I wanted to know why you took that job. What had changed for you?

Bragg: Well, a certain thing, it was sort of like a duty. Senior—I—in a way you got release time for it. But it did represent an attempt at helping with problems that minority faculty faced. That's what the office was there for. And I felt it was my turn.

Wilmot: And it was the years of 1984 to 1986, so that was just the year before you retired. Did you feel that you were at a safe place in your career where you could actually advocate for others?

Bragg: Yes, I—oh, there was one other thing, I was coming up to retirement, I was going to be sixty-eight in '87. There's always more you can do with research—I still do, to this day. But I didn't feel like I was going to be taking on a lot more graduate students for a couple of reasons. One was that the kind of graduate student that I would require in our department was hard to come by. And once you commit to one, you stay with them until he gets his degree. So come five years ahead of your retirement is about the last time you should be taking on new graduate students. I didn't plan to be sticking around on the campus like many had done. I'm not sure exactly what else I had planned to do, but I didn't see me on the podium any more. I didn't look forward to that. I enjoyed it, but I didn't look forward to it. And in competition for funds for research, it's a rat race, and young faculty should have money. I have my doubts that after a certain age, very senior faculty should be having large numbers of students, I just doubt it. I don't think it's a good idea. So it was my turn, I felt, and it was convenient to do at the time, so that's what I did.

Wilmot: Okay, thank you.

Interview 14: August 20, 2002

Wilmot: August 20, interview number fourteen, Professor Robert H. Bragg. From our last conversation, had you thought of anything you wanted to clarify or emphasize?

Bragg: Yes, a couple of things, or maybe three.

Wilmot: Okay.

Bragg: One had to do with my comments about the HBCUs. The comments that I had made and the impressions I had were based on things I saw in 1981, not 2000. Things have happened in some of them since then. Many of them have gotten doctoral programs in limited areas. So that the picture certainly would not be as dismal today as it was then. I guess that's the main thing I wanted to say, that one shouldn't take what I had to say as being my take on the situation now. Some have prospered, some have not. As I say, some have gotten graduate programs. The general situation, though, is still, if one thinks about what's required to have viable programs in a research university, those comments would still be pretty much applicable, I think.

The same caveat had to do with my experience with the chancellor's office. That also goes back, now it's practically fifteen years. God, time flies! And I'm still around! [pounds table]

First of all, if I gave a negative impression of how, whether or not it was a good thing to do, that's wrong; it was a good thing to do, I think. The programs that were run out of this office—I think in terms of total impact, the one that had the most impact would be the Chancellor's Minority Postdoctoral Fellowship Program, which is now the systemwide program. It produced a lot of viable—it still does—viable candidates for faculty positions in prestigious universities. It didn't contribute that much then to Berkeley's faculty, but systemwide I'd say it was, in fact, very good. Where we would talk about my personal gratification about what I was able to do, in some instances I was able to help either by means of grants, some moneys that I had, or just plain old advice. I helped some faculty in their careers.

And I'm not going to be specific and name names, because I think by and large I'm reminded of an experience I've had with getting letters of recommendation that have been requested from my own thesis advisor. And every time, he always sends me a copy of whatever it's been, been requested, used for some kind of professional recognition. He always manages to brag about himself a little bit. [laughs] It's all right, but he doesn't need to brag. He was asked in the first place because he doesn't need to brag. So he doesn't need to brag, just bully me up. But by the same token I think that in the case where—the impression may be got, Joe Blow, whoever, wouldn't have gotten there except for my being in that office, would be the wrong impression. People would have gotten help because they deserved it. I would never stick my neck out, not that it would ever be seen anyway, but I would never do that if it wasn't deserved in the first place. So for that reason, I am just not going to say where I did something that I am proud of. I'll just be happy with that. You don't need to praise me for that, I was just doing my job.

Wilmot: Okay. I want to ask you something. You said “stick your neck out.” Was it hard to stick your neck out for people, what was that like?

Bragg: Well, that was a slip, it's not well-chosen. Most of what, just about all of what was done in the office was done in an advisory capacity. Now, there were things that I did that I would inform my boss, but I wouldn't ask permission necessarily. So “sticking neck out” really meant making decisions that I thought were appropriate for that position, and by and large I'd say I doubt if there were many where I thought I was sticking my neck out. That's not a well-chosen statement.

Wilmot: Okay. And when you say your boss, that was the vice chancellor?

Bragg: That's right.

Wilmot: I'm wondering about something also, which we've kind of talked about. You've mentioned that the position started out in the chancellor's office and then ended up responding to the vice chancellor. Do you remember how that happened?

Bragg: No, I don't know how it happened. I know it did happen. Looking in the files—probably Rodney Reed—I don't quite understand how that came about, because historically I don't think he would have been senior enough at that stage. But Mike Heyman seemed to be on a very first-names and very let-your-hair-down basis with selected black faculty like Rodney Reed, like Olly Wilson to some extent, the guy in anthropology whose name I don't remember again. Bill Shack. But certainly Olly Wilson. In fact, he even took Olly Wilson and his wife to China with him and his wife, which was [laughs] quite a nice thing to do.

But when the program was first really still evolving, I remember seeing a recommendation in the files that Rodney Reed had written about the structure of the office, and true to the fact [laughs] that Rodney was an education administrator, it was an elaborate bureaucracy, which got whittled out by the time it finally was cast in stone; it wasn't anywhere near as big as Rodney would have made it. And I think Mike probably made the right decision. Because over time, the office was really just advisory, [it] certainly had an important function, but not really requiring a big bureaucracy, I think. So I think probably Mike made the right decision. Now, how it got shifted from reporting to him down to reporting to the vice chancellor, probably—and I'm just guessing now because no one discussed this, but Rod Park was a lot harder nut to crack than Mike Heyman.

Wilmot: You said that.

Bragg: I probably made a crack about Mike giving the store away and Park would take it back. [laughs]

Wilmot: Yes.

Bragg: Well, it was a good combination, I think. On the whole they accomplished a great deal together. And in a sense the spirit of the office was there, the operational details, Park ran the campus, Mike was the figurehead, idea man. But the nuts and bolts came through Rod Park, and he was a good one.

Wilmot: I wanted to ask you a bit about your experience at the University of Bordeaux in France. I understand you went there several different summers?

Bragg: Yes. I went, I spent one quarter or something like that, and then I spent another six months, altogether nine months, that would be the equivalent of an academic year.

The first time was my first time to spend any time at all, any significant amount of time in France.

Wilmot: How did that come about?

Bragg: I decided that just about everything that one does as an academic I ought to do at one time or another. One ought to go and visit at another university; one ought to go abroad and spend some time; one ought to spend some time in the government as a bureaucrat; so I was doing all—but I'm hastening up, you see, because I'm starting late. I didn't begin my academic career until I was fifty years old. Already I'm like twenty years behind everybody else, so I've got to rush to do all this stuff. So I decided all the places that I wanted to go, the place that more closely matched my interests, because of the nature of the research they were doing—and also the congeniality of the people. And also, except for English, the easiest language to deal with is French. [laughs] Not that I spoke French, except I could read a little.

So I chose Bordeaux because they were doing research in the same area that I was working, in carbon materials. And more or less the same properties. And two or three of the people there I knew very well from international conferences.

Wilmot: Who were they?

Bragg: Well, the director at that time was [Adolph] Pacault, P-A-C-A-U-L-T, and his right-hand man was Marchand, Andre Marchand, I think. I forget Pacault's first name, and there are two or three others, more junior people. Marchand in particular was a very witty guy, the example of the witty Parisian. He would be a good example, a very French sense of humor, witty, very bright, and very likeable. Anyway, I decided that that would be a good place to spend some time, so I wrote, I called and asked if I could come, and, "Sure, come on, be glad to have you."

Wilmot: What year was that?

Bragg: I don't remember. Somewhere in my resume. I'm sorry, I've got it written down, I don't remember. That was the first time around, that was just for three months. I bought a car after I got there. I got help landing an apartment, and I guess the guy who got stuck with helping me, Serge Flandrois, F-L-A-N-D-R-O-I-S, Flandrois—I gather he probably has had some Russian ancestors. He never really let on that he was irritated, but he got stuck with doing a lot more than he normally did for visitors. At any rate—helped me find an apartment and stuff like that. And I was put into an office with an Algerian postdoc, which was not exactly the level of comfort that one might have expected for a full professor, but it turned out to be helpful because this Algerian eventually came to work with me in Berkeley for several years, and wrote a number of good papers in conjunction with us, so it turned out—

Wilmot: What was his name?

Bragg: His name was Lachter, L-A-C-H-T-E-R. The first name is Abdil Jalil, and I don't know exactly how to spell that, but he shortened it to Jalil.

Wilmot: Abdul Jalil?

Bragg: Not Abdul, Abdil, something like that. Jalil was working on a project for which one of the younger guys had some money, he was working on it. But he—and here's where color comes in, or ethnicity. He saw himself as a North African, and not a Frenchman. Of course he was. But he had been educated at the University of Bordeaux, got his Ph.D. there and had taught there. But also had a little time at—I guess before or after, but had spent a month, a postdoc at Harvard, so he was very fluent in English.

But more than anything else, the transition to living everyday in France was helped very much by being in that office with Lachter. He helped me find a better place that was cheaper. When it came to bargaining at the flea market and stuff like that, Lachter was right there showing me how to do it. And he had an apartment in the old town, which looked like Pepe LeMoko, if you remember those old movies about the Casbah, the old town in Bordeaux looks like the Casbah, it's right down near the river.

And in those—this is a digression, but the old French towns that have not been torn down and rebuilt look like old medieval towns. There were walls with gates to the city, the city had walls around them, and there were gates to them, *portes* they called them. Actually, the word is *porte*. And usually there was a bridge, if it's on the river there's a bridge that leads into that.

Incidentally, there was a Jewish gate around Bordeaux. You wouldn't find that on a piece of stone, archway, but on a map of the city, the word is *Judaïque* or something like that. I hadn't realized that, it was brought home to me that, well, you know, you have anti-Semitism wherever you go, so you shouldn't be too surprised to find it in France as well. They pride themselves on being democratic, but when you get below the fine print, it's still there. Lachter pointed out for example that, like we got to Charles De Gaulle Airport, coming there, if you don't know any better, you think everybody there is a Frenchman. But what you find out is that all the lower level jobs, the custodians, the people who are sweeping the floor and stuff like that are all from somewhere else, they're not Frenchmen. They're Spaniards, they're Portuguese, Algerians, North Africans, and the people that rob you, they're not Frenchmen either. The French wouldn't do it. [laughs] In the places where normally tourists don't go, like you don't have to go to the labor bureau because you're there for a job, you're just there to see the sights. So all the good jobs are held by Frenchmen, not the other people.

Wilmot: All the good jobs are held by Frenchmen?

Bragg: Pretty much. That's not universally true. But when you got beneath the fine print, "If you don't do this we're going to send you back to Algeria," that kind of thing. We would never believe you'd hear that, but they would hear it. Of course, I bought books on the history of France, written in English, of course, but that kind of brought me up too. And I began to remember stuff like the Dreyfus Affair, which had to do with—a famous movie was made of it. I read it. The book, the story was written by Victor Hugo, I think.

But it was a true story about essentially ending the career of a Jewish military officer over some trumped-up charge that he had stolen some money or something like that.

At any rate, despite all of that, I enjoyed that three months there. I went to a conference I think in Pont a Mousson, it means the bridge—

Wilmot: Mousson, sheep?

Bragg: Yes, it's the sheep's bridge, is what it means. There is a monastery there. Anyway, international conference was held by the time I arrived, so I went to that, and coming back I did some things like driving through Orleans Square. I had one very nice acquaintance, and that was Ralph Setton, Setton, who was very fluent in English and French. I think he's Egyptian, but very light skin, so that he looked just like another Frenchman to me. He was the guy if you ever had an international conference and French speakers are having trouble with coming out with the right words, Setton would be the guy that would stand up and say, "Here's what you need to say," come up with the right word. [chuckles] And he showed me things to see that I would never have seen if I hadn't had friends like him.

For example, there's a town which is a national monument now to Nazi cruelty, and it's right next to the town of Limoges. And at the moment the word, the name escapes me. But what it is is a town that had maybe two or three, four hundred people living in it, a little suburb of Limoges. Limoges sits right on the river, and it's famous for china. The clay conditions right there are so pure that the French ceramic industry just built up around this town Limoges. Oradur, that's the name of the town, O-R-A-D-U-R, Oradur sur Glan, means on the Glan River.

Wilmot: Oradur, okay.

Bragg: I would never have known about that if I hadn't been told by Setton. What happened was that during World War II as the Allies were advancing, the Germans are still occupying this town, but the French underground killed some German SS soldiers. And in retaliation for this they collected everybody in the town and shot them all down, burned up some, burned the whole town down, put some of them in ovens. But a few people managed to escape.

Wilmot: The French underground shot some of the German soldiers.

Bragg: Yes, and in retaliation the Germans tried to kill everybody there. And the town is still there. Now it's a landmark; it's a tourist industry now. In fact, the last time I was there a couple years ago, they had even built a beautiful museum that commemorates all this, lots of pictures, it wasn't there the first time I visited way back fifteen or twenty years ago. But you can go through the town, it was pretty much left the way it was, just piles of rubble, old cars go back to the 1930s, still parts of that there. Little plaques reading, saying at this point such-and-such were there, they put these people in the oven. It was a bakery.

Wilmot: Do you mean they put people in the oven and it was a bakery that had been transformed into a—

Bragg: They transformed it into an incinerator for people.

Wilmot: Yes.

Bragg: It was a small suburban town, had a railroad that, a streetcar that actually ran to Limoges; it's that close. But they shot up the town, killed everybody. Except a few people did manage to escape. At that time in the first winter there was a big plaza, like, with a small statuette that said, "Stranger, Look and Remember," something like that. That was then. Now it's got the big convention center, practically, so if you go there now you'll see a lot more information crowded into exhibits and things like that. But anyway, I saw that then. That was very instructional.

The Lascaux, caves of Lascaux, you may remember that way back—you probably read somewhere of caves being discovered in Spain and in the Basque, you know, the mountainous regions of France, where there are these prehistoric drawings going back 20,000 years of animals that no longer existed and so on. And how they got down there and were able to see enough to do these paintings on the walls is still not quite understood. Well, in coming from the Port a Mousson which is over near the Belgian border, coming down through Limoges—it's on the way, I can still come through this place to get to Bordeaux, where I was going to spend my time. And so I went and visited that, that was quite a remarkable sight to see.

And other things, once I got there, and got settled, and sort of learned my way around. Bought a car, and there's about thirty miles—

Wilmot: What kind of car did you buy?

Bragg: It was a Peugeot 102 or 104, which doesn't exist here. It's the French response to the Volkswagen. Except the one that you probably have seen is a Citroen, a little humpbacked-looking car, funny-looking car kind of like the Volkswagen except that it looks even cheaper, and it was. [laughs] The tires are like bicycle tires practically. But the one I had was just a late 1980s, I guess.

Wilmot: You were there in 1983 the first time for the three months, and then 1986.

Bragg: Okay, well, so it would be current. It was probably 102, because it's a little bob-tailed car. You can actually get four people in it, but two of them are going to be [laughs] very uncomfortable. But it was fine. All I needed was to be able to get around. So I could go places. I would go over to Arcachon which is just due west of the border about thirty minutes or less by car, which is right on the Atlantic Ocean. It's a little mini-resort area.

And that was great because I love seafood, and that's what they had! Seafood from the get, and en route there's a big sand dune. The thing must be much taller than a football field. How it ever got the sand dune built up that big I don't know, but that's kind of a resort area. The Frenchmen go there; even they're impressed with it. So things like that, going to Cognac, the town of Cognac where cognac is made, the only place in the world where real cognac is made by law. There's a patent on it. And seeing mushrooms that grow out of those barrels as big as platters like that. They must be awfully—

Wilmot: Like that, like twelve inches wide?

- Bragg: Yes. You may have seen them. I don't know, I've not seen any that big here, but at certain times of the year they harvest these huge mushrooms, and you see them coming into the market areas in big carts. And easily a foot across. And I'd be afraid to eat one of those things, of course, [laughs] being as afraid as I am of mushrooms killing people. But at any rate, these mushrooms—this is wandering, but it is interesting—these mushrooms, this particular variety grows out of the wood that the cognac brandy is being aged in. It grows inside the liquor. And I remember being in this particular tour where right there in this storage area they had a dining room set up with exquisite china and linen and all that for some very special party where they were going to be eating these mushrooms.
- Wilmot: Cognac mushrooms.
- Bragg: [laughs] I'm sure there would be other things besides that, though. But anyway, those are the kinds of things that I learned about being in France as an everyday person.
- Wilmot: So you felt like an everyday person while you were there.
- Bragg: Almost. I certainly felt that I understood a lot more about what it meant to be in France than I had before.
- Wilmot: You mean the second time, or before you had ever gone there?
- Bragg: Well, before I had ever gone to live there. It's one thing to go and you go to a tour in Paris, and a tour guide takes you out and everybody robs you blind and so on. It's another thing to be just in a small town. A lot of things that go with big towns you don't find in a smaller town, and a lot of things that I found in Bordeaux you wouldn't find in a smaller town. [laughs] But on the whole I thought I enjoyed it, and not only the cultural part, going to movies—I had been to France before, incidentally, I had been to a meeting near—Grenoble, but near the Swiss border where I had a different impression of France. But the things I mentioned, plus meeting Lachter, turned out to have important repercussions later because when I went the next time—
- Wilmot: In 1986?
- Bragg: Yes. Lachter was there, and this time, rather than hunting for a place myself, I told him to find me one, and I bought a car in this country to be picked up there, complete with insurance and everything, with an agreement that they would buy it back when my six months was up, which worked out just fine. So all the headaches associated with getting settled were pretty much settled when I got there. I had a furnished apartment; I had a telephone; I eventually got a TV, and lived right on the main drag. In fact, it was a very busy street, Cours of Victor Hugo. I learned what the difference between a *cour* and a—let's see, we have *boulevards*, we have *rues*, and they have *cours*.
- Wilmot: Are you spelling that like “heart,” or like C-O—?
- Bragg: C-O-U-R-S, *cours*. It means, if you think of courts, *cours*. And it's very simple, not that this is important for the story, [laughs] but just random. *Cours* connect *places*. *Places* essentially are kind of a roundabout at sort of key points, gridpoint. And you can be sure if you get on a *cours* and stay on it it will get you from one *place* to another, some

central *place*, and radiating from that will be other *cours*. And coming off of the *cours* will be *rues*; *rues* are like little streets. So now in a big town some *rues* will be pretty big, like Paris for example. But in ordinary French towns, the *cours* are the main roads you want to be on. Every so often you might find a *boulevard*, there wouldn't be many of those, because they would be a wide street that goes great distances without interruption. I've learned about the way the towns are laid out, *arrondissements*, wards is what they are.

So all those things I learned. I really learned how to live in France.

Wilmot: Well, let me ask you, what were your interactions like with the French people?

Bragg: For the most part they were with trades people. That would be like the grocery store or the cleaners, or the bakery, or things like that. Some of those would be French, some of them were not. For example, I remember one time the place where I got my *baguettes* every day—it's a long stick loaf.

Wilmot: [laughs] I know.

Bragg: In fact, it's funny to see a Frenchman get his baguette. They've got a little piece of paper just about as big as a 8 1/2 by 11 sheet of paper wrapped around it, and he would stick that under his arm and get on his bike and pedal away. Well, not all Frenchmen bathe every day. [laughs] And so you can imagine. We tend to be a little bit fastidious, I think, compared to them. And that may be changing, too. But not everyone had—even if they had facilities for it, took a bath every day. [laughs] Probably that's what led to the evolution of the French perfume industry, to cover up all of the body odor.

But anyway, at any rate, my interaction mainly had to do with those. Other than that, it was the people at the laboratory. I had a few contacts, very few social contacts outside of the laboratory situation, but mainly the people I saw socially would be the people at the lab. And of course there were people from the States who knew I was there who, now that I am there, they know somebody in France and they want to do more than just go to Paris. So I, having a car, it's easy for me to drive back and forth to town, Paris, I mean, pick up people and bring them down to Bordeaux. Show them around, take them out to Arcachon. And later, go as far down as Biarritz.

Wilmot: Ooooooh.

Bragg: Now, Biarritz is like—it used to be the French Riviera.

Wilmot: Yeah!

Bragg: It's not that anymore, it's more like, local now. But at one time it was international. But even so, it's a beautiful place. It's a resort town, gambling, the whole bit. Five-star hotels.

So, as I say I did all of that, and enjoyed every bit of it. The second time I had a better apartment. And the second time Lachter introduced me to a—I'm not sure whether he was a Moroccan, but some kind of North African guy who had an apartment in Paris. It wasn't a very grandiose one. It just had a bedroom, a bathroom, a kitchen, maybe a little

reading room. It was kind of small. But it was a way—a blue collar—not—a white collar—maybe blue or white—he was a lecturer in political science, so it wasn't exactly a hovel. But to give an idea, the kitchen was maybe as big as mine there.

Wilmot: So what did that mean for you? Did you go and stay in his—?

Bragg: Well, the deal was, he was coming to Berkeley, of all places, to do some intensive language instruction. And the deal was that he could stay in my place. I'm not sure which time this was, but he could stay in my place, and in exchange for that, I could use his place in Paris whenever I wanted it. He had a girlfriend or something that he left there. But anyway, the point was that I could just go to the concierge and call him up and tell him I want the place and I would have the key, and have access to the place. So that meant that I had my own room, hotel room, and would be able to cook or whatever, whenever I wanted to go to Paris. So it made it real nice. If people would come to visit me, I could maybe come and stay a few days in Paris and then take off for Bordeaux or something, nice.

Wilmot: Did you ever think about James Baldwin in Paris?

Bragg: No, actually I didn't. Now, subsequently—one of our—a black history professor who was one of our minority postdoctoral fellows—actually, he's on the faculty at Santa Cruz, I forget his name now, but—wrote a book having to do with the French experience in the good old days. Not so much the Baldwin era, but coming up to the time when jazz made a big impact on Paris, France on black expatriates was really booming, going back, starting in the twenties and going on through World War II. After that it kind of—a new day came.

Wilmot: Right.

Bragg: But people like Richard Wright, entertainers like Brick Top, Sidney Bechet, jazz—all those people lived in a certain part of Paris. The last time I was there I made it a point to look up this area, it turns out it looks like any other old area now, just kind of working class. But in terms of the lifestyle that they lived, I didn't have that.

Wilmot: I'm aware of this, I was just kind of thinking about that past, and what that was like.

Bragg: Well, it was a very special past, because you see, they—first of all, Paris is not—Paris is France, but it's not.

Wilmot: Because it's an international city?

Bragg: It's a big museum. It's a hip city and all that, but really it's not that big. Paris is just one great big museum. It's surprising. Once you've got over the excitement of all, every place you look is a big museum, it's really not all that big! Of course it's loaded with tourists, naturally, but in terms of the industries that go with it, Paris is not that much. Within that context, the people we're talking about had gone there because they are artists. And the French artists did not live all over town, they lived in a fairly narrow segment of the town, which now you can't get into for these boutique-y shops and things. Or they lived with like the West Africans and North Africans and whatnot. But

mostly these people would hang out in cheap cafes like the other artists did. So it was not really what France was all about.

Wilmot: You know, I've noticed, you haven't really mentioned your academic experience while you were there. Did it play a very small part in your time there?

Bragg: In one respect I did some thinking that I normally wouldn't have been able to do, I talked to people and got ideas, or exhausted ideas that I didn't, had not had, let's say. Wrote one paper that actually got published—it wasn't a very good one, incidentally. I guess I co-authored one too. The main thing was to have time to think. Some of the ideas that I had, you could talk about with people who really understood them and it helps you to make those clearer.

Wilmot: What were you thinking about?

Bragg: By the time that I'm getting into this I'm mostly concerned with the whole notion of the mechanism of graphitization, which is a riddle that I think I pretty much understand most of it now, but at that time it hadn't become kind of backwater. See, there is a certain culture, or maybe the word fad is better. But a thing becomes considered to be important because the people who are the movers and shakers say it's important. And at some point what they're doing doesn't produce very dramatic results; next ounces of effort, next ten or twenty or fifty ounces of effort produce very little more change, at which point they move on to something else. It doesn't mean the problems all got solved, which means that the next step towards the solution is not easy to come by.

So under ordinary circumstances I would have been jumping around like everybody else. But I am still plugging away at the thing that fascinates me. So nothing really dramatic is going to come out of what I'm doing, but I'm becoming very familiar with just about everything that was ever done on the subject because nobody was rushing, I don't have to beat anybody to get there. So in that sense I spent a good time becoming fully engrossed or knowledgeable about the literature, the nuances, who had done what, when, where.

Wilmot: Around graphitization.

Bragg: Yes. The second time I was there, the biggest thing that happened was that one of the postdocs that I'd had working with me—I forget how the thing came about, but—wrote something and sent it to me to review. And when I went over it, a notion occurred to me, which eventually led to where I am now. But my first step was to—it involved the concept of multiple metastable states of material.

Metastable means it's definite—well, let's see, what would be a good example of metastable. If I would take this—this is not a good example, but let's say had that rectangular item there, [puts item on table] that's a metastable state. [moves item] That's a stable state. It's not going to—if I tip it either way, it wants to come back. Now, imagine a material possessing several conditions where with a little noise you can go from one state to the other, and some are more energetic than others. Then the notion of multiple metastable states was what I began to ponder, and derive some equations, which I sent back to Lachter and he did some calculations. You have to be careful, if

someone brings you back what you want to see, because it isn't always right. And whereas he did some good curve fitting studies, they were wrong.

Wilmot: Curve fitting.

Bragg: Curve fitting means taking data and making the data fit, fitting the data to an equation, to some equations. And he did that, and it looked promising. It led in the right direction, but the numbers were wrong, and so—it didn't mean it was wasted, but it meant it was wrong. It was misleading. But that was the big technical fallout from that.

But when I came back, the fact of the—some of the numbers being physically impossible, let's put it that way, led to some—I guess the idea is this, you shouldn't be dismayed if what seems to be a good idea doesn't turn out to work everything perfectly. It may be that some of it is right, but not all of it, so go back and tweak it, don't throw it away. Don't throw up your hands just because it didn't all work out perfectly. In other words, look at the part that is good and see if you can improve on that. The part that's bad tells you, well, that part you shouldn't have had in there. In other words, I was encouraged, but I also realized that that attack was not perfectly right.

That led to some questions about what were the nature of these states, metastable states? And that led to some studies of looking through the literature and to our own experiments to identify these states. So that was done and all the stuff then was by—well, it took some years after that before really everything fell in place. But I got on the right track by virtue of that, that was the big thing that happened, technically.

Wilmot: Do you feel like we have talked about Bordeaux? Is there more that you want to say about Bordeaux?

Bragg: Yes, I think it was a great experience. I enjoyed every bit of it. I've been back through there since several times. About the only thing I ever would add would be for people who love seafood, Arcachon, there's a town right next to it, La Rochelle, I think it is, which is supposed to have the best oysters in all of France. And Arcachon is close to that, I mean in terms of quality. So much so that weekends you could go out on the street, then, I don't know about now, and guys would come along and set up stands with oysters of different grades, so much a dozen here, so much a dozen there, and you could sample them too. "I'm not sure, how about some of those," you could take one and cut it, and you'd sample some, "I'm going to take a dozen of these, a dozen of these." Buy just like you were picking out fruit. And I steam them, you know. I didn't ever fry them, but steamed oysters and whatnot, I ate my fill.

Wilmot: Yes. I love oysters too. Yes, those are good. Did you encounter different attitudes around race from French people?

Bragg: In general there wasn't a lot of discussion about it amongst the faculty, I'm talking about the—it was not the University of Bordeaux, it was the Institute [Pascal], which, it's just like the Lawrence Berkeley Laboratory and the University of California, Berkeley. So I was attached not to the university but to the laboratory. It depended from the university, but my direct affiliation was with the laboratory. So one is more or less equivalent to the other. No, I guess that's about it for Bordeaux. I enjoyed it.

Wilmot: Okay. I'm just going to ask you also about your time at the University of Ife in Nigeria, also called Awolowo.

Bragg: Obafemi Awolowo.

Wilmot: That was in 1992 and 1993 after you retired and you won your Fulbright. So I wanted to ask you first about how you—

Bragg: How do you get a Fulbright in the first place?

Wilmot: How did you get the Fulbright, but also like how did you decide to go to Obafemi Awolowo University, who you knew there, how did that whole opportunity come about? Especially after retirement?

Bragg: Let's take a quick break.

Wilmot: Okay.

[interview interruption]

Wilmot: Yes, how did that happen to come about?

Bragg: It goes back to '76, '77, '78 probably. I was attending a meeting in Germany, I think, carbon, carbon always. Probably in Baden Baden, there's a big beautiful spa there. And for several years coming up to that I had met African Nigerians at Berkeley who had said, "Why don't you come visit us?" At that time Nigeria still had plenty of money. The oil glut had just put money everywhere, and they were building universities like crazy. And so I decided more or less at the last minute, "Well, I'm going to be in Germany, why don't I just detour through Africa?" So without too much planning—I had met the guy who was then the chairman of the physics department at what was then the University of Ife. Ife is the ancestral home of the Yorubas, Yoruba is a major tribe in Nigeria. All the stuff that you see in Cuba, the Santeria, for example, is derived from Yoruba. The candomblé in Brazil, they are all heavily Yoruba, and the whole Orisha thing.

At any rate, I had met Francis Oluwole, O-L-U, Oluwole, like Wole Soyinka, who was a Nigerian, who was a Yoruba, and actually taught at the University of Ife. He, Oluwole was the chairman of the physics department at Ife, and urged me to visit. He had done his Ph.D. at Berkeley in physics, but he had had a course in materials science. He had come over, and I guess he had had an engineering physics undergraduate degree, and they required him to take a course in materials science. He remembered that, and so when he became the chairman of the physics department at the University of Ife, which was about 100 miles or so from Lagos, he being very patriotic and far-seeing, I thought, thinking that Nigeria is not going to have a lot of oil always, and it has got to come into the twentieth century, and whatever you do you are going to wind up either doing handiwork or manufacturing. You are going to have to have energy, and you are going to have to have materials.

So he had had this course in materials science, the introductory one, and he of course had done—not of course, but had done work in nuclear physics. So to replace the

energy, the oil, he thought nuclear, which is what we tried to do. Well, the problem that the Nigerian—all developing countries face with respect to scientific research is how to keep people—a problem—working in science when the demands or rewards monetarily are not very great, considering the amount of effort you put in. You can go through a four-year course in engineering and come out with an engineering bachelor's degree, get a job as an engineer, and start off being able to earn as much as a Ph.D. does four or five years later. That's not quite true. But in a culture where the Ph.D. is not a cultural landmark, a cultural rule of thumb, it's kind of a luxury to get a Ph.D. So a typical developing country has trouble keeping their bright young people headed towards Ph.D.s in physics or chemistry. The brightest ones tend to right away venture off into electrical engineering or chemical engineering or computer science, something like that. And the question is, how do you keep them in these ideas long enough that they'll get the bug and stay in science? In other words, even a major, an undergraduate degree in physics, let alone a graduate degree. So most physics departments are service departments, and that's true of HBCUs too. They have a lot of courses in the catalog, but basically just teach sophomore physics for engineers or medical people in nursing and whatever.

Wilmot: And that's what you call “service”?

Bragg: Yes.

Wilmot: Okay.

Bragg: Incidentally, [laughs] when physics departments are really big, it's because they do service courses. So do English courses, for that matter. Everybody has to have English, so a lot of people just teach English, you know, freshman composition. So the major departments, major fields do that, and physics is no exception. But it's more egregious there. So the idea, he had the idea, “Well, why don't we put materials science, put options in materials science or in nuclear engineering in the physics curriculum. Let them learn a enough practical stuff to get bitten by the bug and still stick around to get their undergraduate physics degree, and maybe they will be able to go on. If not, they will still be better off, will be better off than if they just went to the traditional engineering disciplines.”

So he had this idea, and so since I was the black presence in materials science at Berkeley, he knew who I was. So he had invited me to come. So this year, I said there being a conference in Germany, I guess it was, I figured, well, it's not that much of a detour to go to Africa on my way back home. Well, [laughs] it's a pretty damn big detour, actually! [laughs] But I hadn't reckoned with the fact that there's more to it than just going to a travel agency, getting everything done right. For example, I decided, well, heck, if I'm going to do this—I had had some Ghanaian graduate students who had contacts in Ghana. They said, “Well, you've got to visit Ghana.” So, [laughs] without going through lots of rigmarole, I had to get visas, I had to get money. Some of them are so—like in Ghana they were so poor at the time that to make sure you didn't come and take any money out, they sold you some money just to get in. [laughs] You have to buy a certain number of their cedis just to get your visa to go to visit Ghana. So I spent a number of days around Washington, D.C, around the Ghanaian embassy just getting approval to go there. But eventually I went, and when I got to—I guess my first leg took me through Lagos, from Frankfurt, Germany, and although I didn't get off there, the

plane, the German airline (Lufthansa) stopped at Lagos and then continued to Ghana, to Accra. Well, I had had some brand-new luggage, my slide rule, some new suits and everything in my luggage, and none of it got off. When I got to Accra, none of it got off with me, so I assume it was stolen in Lagos. Never did recover it, incidentally.

But got to Ghana, and I thought I had reserved hotel accommodations there. It wound up that nobody knew I was coming and the hotel was like, I forget the name of it, but it was pretty spartan by our accommodations now, but it was rather nice then, considering. I was lucky enough to hook up the next day with the secretary of the Aluminum Industries Commission of Ghana.

Wilmot: How'd you hook up with him?

Bragg: I don't know how that happened, but somebody must have hooked me up, because his secretary, who had studied, had lived in the UK, in England, was very hip, and she knew everything, how to get everything done, so helped me to get some clothes, hooked me up with the vice chancellor who was then in charge of the University of Science and Technology in Kumasi, which is the big engineering town there, that is the big engineering school in Ghana. Did a lot of arrangements for me to travel around Ghana, which was very nice, so before we even get into Nigeria I'm getting a very good impression of what at least Ghana is like, what the Ghanaians are like.

But then on to Nigeria where I discovered, I ran into what was called the "Go Slow," that's what they call it, the Nigerians call it the "Go Slow" because of the traffic jams. With all that money, every agency that had some money would order stuff from Europe, and only so much of it can be put off at any one time, in the meanwhile they're putting off stuff to build the roads. So what you've got is just one massive traffic jam. And so you go slow, called it the "Go Slow." A trip that might have taken fifteen minutes from the airport downtown to the Federal Palace Hotel, which is right on the bay there, would take two hours, the car just wouldn't move. And of course I hadn't learned how to bargain with the cab drivers and whatnot, so by the time I get to my hotel where they don't expect me, I have practically no money.

I'm practically broke, and the naira is greatly inflated; one naira is worth like two dollars, whereas when I left there in 1992 it was worth like ten cents. But at any rate, the guy at the desk—and I don't know whether they were cheating me or not—but offers me a room that I have got maybe enough money to spend one night. I have not been met at the airport, incidentally. So he said, "Well, take it or not." So I took it. [laughs] And there's always a calm before the storm, things are always darkest before dawn. This place is like not too well kept, not even Holiday Inn, maybe a little bit less grandiose. But it at least it has air conditioning, has television, it's clean, it's neat.

And by the time I have gotten a bath and rested up, there's a knock on the door. And here's the guy who got his Ph.D. at Stanford, and he is the guy who missed me at the airport somehow. [laughs] But he shows up, and he is going to be my guide. So it was a great time. He had a pocketful of money, "Don't worry, we'll get you some clothes," and so on, got a driver and a car. And in those days then you didn't drive your own car, the university had cars for your use—that you requisition a car, and they gave you a car with a driver and you sat in the back. So, and the guy of course, he knew Stanford, he knew East Palo Alto, he knew some people I knew, so it was a lot of fun.

Wilmot: What's his name?

Bragg: I'm trying to remember now, it'll come to me before we're done. At any rate, this first time I'm taken to the campus, and Oluwole has arranged for me to use the vice chancellor's lodge which essentially is that: it's an apartment complete with a bar in the kitchen and all that, and a cook. And I'm just living like a lord, practically. During the day I met faculty, was taken around the campus, which was still being constructed, very modernistic structures that you will see pictures of.

And we get down to brass tacks. He is interested in setting up an option in materials science in the physics department, as I mentioned earlier. And so a lot of the time that we were there, I spent talking with him and the faculty drawing up more or less a map: what is a minimum amount of this, that, and the other, coursework and equipment and all that you should have in order to make this go. And some stuff I promised to send back once I got to Berkeley, which I did. This was a very nice experience, I might add. And I met the guy who became his successor. Took some trips around the country, showed me waterfalls, stuff I just didn't believe existed. Then the next year it turned out that not much of that plan had been executed, and they said, "Why don't you come back again?"

Wilmot: Now, can you help me again understand the timing here, because this seems to me that this occurred in the late seventies.

Bragg: Yes, right.

Wilmot: Then, but the actual Fulbright was much—okay, I understand.

Bragg: Well, really, it's rather elaborate, but you understand why, how this goes, goes back this far.

Wilmot: I understand, it's important.

Bragg: Yes. The first time I went on my money. But now I don't plan to go back on my money, they said, "Well, we'll find a way." What they did was to have me appointed to be an external examiner. The British system, instead of having accreditation bodies like we do, they exchange examiners. Examiners will go from Cambridge to Oxford, and they go from Oxford to Cambridge. And so the exams for your students, a course in Sociology 202, say, would be written—you didn't know what book you taught in and all that and the outline, but the exam would be written by other people so that you couldn't cheat and make your students look good. So in that way they tried to guarantee quality by making you sort of ensure that your students really could do what you say they are supposed to be able to do. In practice it turns out it isn't that honest.

But at any rate, there's no need to have me come all the way from America to be an external examiner when they could go right down to Lagos or certainly within about 600 miles to find somebody who could do that. But they sold my trip on the basis of my being an external examiner. I did that, of course, read the exams and they were very competitive, but the real purpose was to go there and still discuss the development of this curriculum.

So I went back a second time that year, and I went back one more year. This time it turned out that some of the equipment had been bought, but the most critical items that I was familiar with were absolutely wrong. The x-ray equipment, which I knew a lot about, had been bought. The assignment to do that had been given to one faculty member who just totally—I'm not sure exactly what happened, but it was so discouraging and disgusting to me that, "Well, look, at this point I don't see why you need me anymore." It was totally unfitted for the purpose of teaching materials science. I had given some alternatives, but he didn't choose any one of those. Now, the reason that was done, it turns out was that—it wasn't exactly his fault. There was a holdover from colonialism that said all of the buying of things from Europe was done through trade arrangements that formerly existed between, say, Nigeria and the UK. And so the equipment that I was recommending wasn't being built in the UK. They built some x-ray equipment, but it wasn't suitable for their purposes at Ife, they could have gone to Holland or to America, but he ill-advisedly let them talk him into buying stuff they really didn't—and that stuff never was really—it got commissioned, but never really used. The reason I'm saying it was ill-advised was because the guy who was the chairman of the geology department had been trained in Berkeley, and they did have the kind of equipment I recommended. So it could have been done, but he just didn't do it. I just kind of—I'm not sure I was that adamant about it, but I said, "I don't see—at this point I don't think you really need me."

But in the meantime, the department chair changed. Also the accommodations changed too. The next year, instead of having the vice chancellor's lodge with all these servants, I had a little chalet, which was—it's still there, some little faculty housing, two-bedroom, one-bath places, each one with its own candles because the electricity is always going off. But not too far from the staff club where meals are served and whatnot.

The third year they had me in a conference center, but they hadn't hooked up the hot water. [laughs] So I got used to taking—if you've never taken a cold-water bath, showers, that is an experience that—it could be done, but if it's not warm in the first place, taking a cold-water shower is kind of much. You have really got to steel yourself until your body adjust to it. But anyway, so my accommodations kind of went down, down, down, and the enthusiasm also.

But they did institute the program in materials science, which as far as I know is still there. They graduated many people who went on to places like Stanford, Berkeley, MIT, UCLA to get the degree, so it did pay off. And not that I was that instrumental, that was just the way it was going to happen. Well, some years later, the guy who had succeeded Oluwole as chairman, his name is Aladekomo—

Wilmot: How do you spell that?

Bragg: If you think of Ala, and then D-E-K-O-M-O. A-L-A D-E-K-O-M-O.

Wilmot: Aladekomo.

Bragg: J.B. Aladekomo. He had become the department chair. He and his wife had been very nice to me, taking me around to where the river god had a shrine. They were just very hospitable. He wrote, said he's got a sabbatical coming, and he wanted to learn

something about x-ray diffraction, the thing that he had not done right by that I complained about before, and he wanted to come to Berkeley. Said, "Sure, come on, be glad to have you." So he comes, and he wants to learn about x-ray diffraction.

And it turned out that some work that had been done by a master's student to work on part of this graphitization problem, and the work was pretty good, but I wasn't that satisfied with the interpretation of the x-ray data that came out of it. And so I said, "Well, look, why don't you do this? This is probably not too bad, but something's wrong with it. I'd like you to remeasure these data, and in the process of doing that you'll have to learn how to operate the equipment, how to analyze the data, everything you need to know you're going to learn in doing this redetermination." Well, that guy turned out to be so good, and so searching with questions of things that I more or less sloughed off beforehand, that I had to really get in and think about them now. As a consequence, we rewrote, we co-authored the subsequent paper that came out of it. A lot of new things came out of it that helped to improve on the understanding of the model that had been—so it was very beneficial to me.

And when he left, we hadn't finished the paper. We had got all the data, but we did the rest of it by mail. And somewhere along the line I either was asked to review some papers for a Fulbright or something like that, I don't know how it came about, but I learned about the Fulbright program. I must have known about it before. And I think I had applied, and missed the cut. But I was encouraged to reapply. And so the point of this was to go and finish up—we had finished that paper, but some more ideas had come in the meantime—and to go and continue this collaboration, which from the Fulbright's point of view made sense. In other words, it wasn't just something that would jump up and die off, but it was something that would be continuing. So it was a good choice to give me the grant because it meant that—well, what happened is that all too often people in the developing countries go off to do a Fulbright, and they go and work like hell for one year on something, and they go back home and they can't keep it going. And so it kind of dies for another five years or ten years until they get another one, not much good comes out of it. So from the Fulbright point of view it did make sense, it made more sense than a lot of things would.

So I got the grant and I went, and it turned out that the university was on strike, had been on strike for months. I went in I guess September of '92. Naturally I am glad to see my old friends, they are glad to see me. And by now he is the provost for science and agriculture. He has risen up in the world. Interesting developments, once I got the notice I have the Fulbright, then there is a lot of preparation. We have got to get orientation, our visas, things like that, a lot of stuff that has to be done beforehand, because now you're going to be gone for a year. It's different from just going for a visit. I've got to ship things over there and do it in a certain way.

And meanwhile I'm talking about, well, how am I going to live? Well, when I had been there before, I hadn't worried about that because the first time, as I say, I lived like a lord. The second time I had this chalet, which would have been about right for one person. The third time was the conference center, which was like being in a motel, that wasn't a good idea at all. Although it wouldn't have been bad to eat my meals in the restaurant; some Fulbrighters did that. But no, I'm now a full professor, and you can't do that, so you have to have a house and a servant.

Wilmot: That was your decision or their decision?

Bragg: My friends. Said, "Well, you have got to have a house and a servant." And having some power in the university, he could intercede with the housing committee. At one time they did that automatically for visiting scientists, supplied them with a house and a servant. So this time they supplied me with a house but not the servant.

Well, it turned out the house was—fortunes have changed a great deal from '76, '77, '78 to '92. Much of what I had seen when I left in '78 had not changed. The buildings that had been started were just in the same state of construction that I had seen earlier, and so the government had not only run out of money, the large amounts of money that were being made available earlier had shrunk now. They were constantly on strike because they were underpaid. The guy who had been able to every two or three years go abroad for a year and buy a new car every three or four years, now they have to keep all that. So things changed, and getting the house free was fine, but with that did not go a car or a servant. Well, I didn't need, I didn't qualify for a whole house; I didn't have a family with me, but they just said, "Well, he's going to have a family, so he needs a house." [laughs]

As far as a car was concerned, I said, "Well, look, why don't I just rent a car?" He said, "Well, there's no such—." He didn't think there was any way to do that in Nigeria at that time. But the university had cars which they were unable to repair for lack of money for parts, and I could have use of one of those if I fixed it. So therein lies a funny tale, because for some reason, once—and these cars were literally the same Peugeots I had seen there when I was there in '78 or thereabouts; they were still there. [laughs] They hadn't replaced them. They were run down, and the rubber is all broken, and just brittle. And ordinary parts were very costly, no tires are sitting on the axle because the tires are all gone. Well, to make a long story short, when it became known that I was going to fix this car, that car got cannibalized, and he never told me this, but by the time I arrived the cost of fixing that car damn near came up to the cost of buying one. He never did really—well, yes he did, in a way, but it made him almost physically ill, he felt he had misled me, when it wasn't his fault, but it was just the way things went. It never was quite up to a new Peugeot, even that early vintage kind.

Wilmot: Did you end up driving that car?

Bragg: Oh, yes. I went where I felt like driving. Otherwise I'd just get a driver from the drivers' pool and he'd drive me. But I had a car. Two or three weeks after I was there I had the car, they were still fixing it.

His wife decided that she would take on the job of seeing about my personal life, my food, my housing, cleaning and all of that. So she interviews a young man who is like maybe twenty, who is a cousin of one of the employees at the staff club, who is dealing with the food and stuff like that. Oh, I'm sorry, yes, the staff club is like a motel where you rent rooms, and eat, they have a restaurant and so on. So he is put to work there with three months of training, so he will be able to take care, cook for me, and clean and all that. His name was Monday. Monday, named for the day of the week he was born.

So I'm all set up, I've got a house, I've got a servant, I've got a car and all that. And I get there, of course, it turns out as I said the university was on strike. It opened up long

enough to finish the exams of the previous spring. The quarter was now fall, almost Christmas, and had the graduation ceremony, very colorful ceremonies, all these robes, people from—from sheiks, from the north, the imams, and all kinds of people, Arabs with daggers, the whole bit. And of course people in tuxes, including people who eventually I read about in the news like Abiola who was assassinated—that's not the right word—anyway, Abiola who won the election later and was denied—declared not the winner.

But anyway, the point is that I was all set up, and in a way it was okay except that classes never did, except for finishing up the exams, never did reopen the whole time I was there. The question is, how are you going to do anything? You went there to do some research, how can you do that? Well, we couldn't do the experiments that we had set out to do. One reason was the equipment that we thought we would have access to wasn't working, and it turned out that I could get that fixed by knowing how it worked and everything, there were things that weren't too difficult to do that I could get it going.

Wilmot: You could do it yourself.

Bragg: Yes, with a technician, who turned out to be not too well grounded in physics. By developing a lab course to just, essentially one-on-one, to get him up to the point where he could do experiments. But some other things, shortage of chart paper, or other stuff I would take out of my Fulbright budget, I had a modest budget to help me which they realized was necessary.

But then, I said, "Well, look, although we can't do this, there are some other ideas that I need to work on." And one of the undergraduate physics majors—where he came from I don't know—but attached himself to me more or less, and I paid him a little stipend to do calculations for me. And there was another lecturer there, which means like an assistant professor, who had been at the Imperial College, got his Ph.D. there, and we worked together to some extent. So we got some things done despite the fact that the university didn't really function, the university was still on strike.

One thing is once it is on strike people don't come around, because there's nothing to do. So a lot of the intellectual interaction I looked forward to just didn't happen, because people were off making a living, doing something else. Nevertheless it was very interesting. I got around a lot, more than ever before, naturally. I learned a lot about the nuances now of culture. I met people who had lived there for years. One woman in particular who had gone to Berkeley here, or rather to I guess San Francisco State and eventually came back to live here. She lives here now—who was then part of the library staff of the university. In the meantime what had been the University of Ife, set up in '78, had now become Obafemi Awolowo University, named after a prominent Nigerian politician.

So culturally, I learned a lot more than I learned in those first two or three weeks that I had spent there. Scientifically, the main things I learned were that some of the ideas I had weren't any good, if you tried to make calculations they didn't work out. But some other ideas that I had eventually resulted in a paper that we were able to write, so we did get a paper out of it, in conjunction with Aladekomo.

Wilmot: Aladekomo.

Bragg: Yes. A lot of funny stories that I won't go into, of course, but on the whole I found it very, very interesting. Naturally I bought books on the history of Nigeria—

Wilmot: What kind of funny stories?

Bragg: Well, for example, take polygamy. One lady I met, she was African American, had been in the library, had lived in the town of Oyo, which is the old capital of Yorubaland, it stems from the ancestral home now, Oyo was like a kingdom at one time. And there was a girls' school there run by the federal government, and she had come over to teach in it. And eventually she had been there eight or ten years and came over to the University of Ife, in charge of the library staff. So she knew the movers and shakers in Oyo. So being more or less a homie, she would take me over to Oyo where she used to hang out. As an American woman she could get away with things that a Nigerian woman could not, so she would know not the men's wives, but their girlfriends.

But I discovered that that particular town was run alternately by different families to keep the peace. Your family, if it's your family's turn to rule you would rule, but when your rulers died, Family B would put its man in. And so it circulated between two or three families. Most of the time it worked out okay, but every so often there would be some dissension that was really deadly, and people would kill each other. But I found these guys to be really a lot of fun. And so I met one guy, for example, who had spent some time going to school at North Carolina A&T who came home to find out that one of his wives had a son that wasn't his. I mean, he has got a couple of wives, you see. He is college-educated, he still had two wives. And that was fairly common, for men to have several wives. Not amongst the university faculty. He was in a technical school, not the university, in that town there.

Once you get over the notion that things don't work quite the same way as at home and it's a different culture, you just adjust to it. So I learned that the women didn't particularly like polygamy. But the men did. [laughs] And the notion about polygamy being that a man had to be rich to have several wives was just not true. Now, he couldn't very well be poor, he wouldn't be too poor. But each woman more or less had to work; she couldn't just go and sit down just because she's a second wife or a third wife. And the wives had rank; the senior wife would rule, more or less rule the others to some extent, all under the benign influence and control of the husband. But it had its culture. A woman, for example, would rather marry an industrious man even if he had two wives, rather than marry a non-industrious man who didn't have any. So it was power, you would hook yourself to power and influence. And women, great traders, you might see a woman with a big head—you know, on her head is balanced a lot of goods, that might be her whole store. But she would make money sitting in the market selling that stuff.

But anyway, once you got used to the idea that it's a common practice, well, that's just the way it was. I met one African American woman who was involved in a polygamous marriage. She more or less started explaining—I met her at a party that was given in my honor, and before we could get through exchanging names she was explaining how she got into it, I didn't ask her. [laughs]

Wilmot: She must have been sensitive about it.

Bragg: Well, I'm sure she realized that I would be a little surprised that she would be doing that. She was a faculty member doing statistics or something like that too, she wasn't just there.

And I went to parties. One Christmas party, my host's wife, who was the bursar of the university—her name was Lanre, L-A-N-R-E—being the bursar, she has her own driver, has her own car, naturally. Sends the driver by my house with a tailor, who proceeds to measure me for a suit, because we're going to be going to a Christmas party, and I have got to be dressed appropriately. So I can't be wearing a regular suit like I wear, I've got to be looking like a Nigerian. And so we go to this Christmas party, it turns out that this guy (the host) is the managing director of a brewery, Nigerians love beer, and somebody said that well, it doesn't matter whether times are good or bad, if you're selling beer you're doing okay, because they would drink beer in any case.

And this guy has got a huge compound in this adjacent town. The party is set up out on the grounds, they rented tents, very colorful tents. Probably most of the vehicles that showed up there were Mercedes, a few Peugeots like ours. Big dish, satellite dish, and a big band and everything. Just about everybody there is some kind of an official in something. Now I guess the only reason we're there is that Lanre is a friend of the guy's wife, went to school with her or something like that. Or maybe also because JB was the provost, but I think Lanre was his wife's connection. Nobody there is wearing Western dress, we're all dressed like traditional the Nigerians dress. I may still have that outfit around somewhere. The grounds were so big that it even has a row, a little street of bungalows in which we stayed, spent the night in one of them. It had two bedrooms, a living room with video and hi-fi and all that, kitchen. But no matter where you go, the water supply is always a problem. Water and electricity are always something you can't count on. So you would find there is a big tank there and a pail for dipping water into the toilet or whatever, in the most lavish of places. Except the Sheraton Hotel in Lagos. [laughs] There, the tank was up on the roof. [laughs] But ordinary motels or homes, whatever, you would always find that water supply was a serious problem. It was true of my house, incidentally. I had a 500-gallon tank outside, fed from the university's dam. They had a dammed-up supply of water, but from time to time that got cut off for some reason, so you'd have to bail.

Wilmot: I have a question for you.

Bragg: Shoot. I just think it's—some of it was so funny. [laughs] Go ahead.

Wilmot: I have two questions for you. The first one was, when you finished your Fulbright, did you have to report to the Fulbright?

Bragg: Yes.

Wilmot: And so how did you describe kind of the challenges that you faced in doing your work?

Bragg: I wrote a report that said what I had done. I reported on the things that were irksome. There are several things the report wants to know. First of all, did you get anything done? But what was good, what was bad, what would you change, what would you recommend and so on. So it has several functions. And I may have that report around someplace. I wrote a draft of it before I left, but I didn't finish it until I got to Ghana.

Because it turned out that as we were coming up to the end of the academic year, they were going to have their first elections—they had promised elections for a number of years. The current military government has been—probably second or third since I was there in '78—the current government had promised people they were going to finally have elections and transform to civilian government. They had done it once before, it went up in shambles.

The day of the election, the way the election was going, it turned out the government's candidate was losing, and the winner was going to be a guy named Abiola, who was a rich guy.

Wilmot: You mentioned his name before.

Bragg: Yes, interesting guy. Abiola was winning, and so the government declared the election to be fraudulent. And the people began to riot. For example, I remember going to the airport that Sunday to pick up my brother who was coming to visit me—he had never been to Africa. He was going to visit with me in Nigeria for a while, then they were going to go over to Ghana.

Wilmot: This is your brother who I met?

Bragg: Yes. And his daughter was going to come and join us in Ghana. So we were going to have a hell of a good time in Africa. Well, on the way from the airport we had to come through parts of Lagos where the young people were rioting. They were putting barricades in street intersections and setting them on fire and things like that. So our driver, who happened to know the streets very well, was able to get us back home without incident. But word comes down from the Fulbright office saying, "If you don't have to stay, get out. Because things are hot, and we don't think you should stay there." So my brother pitched in helping me to pack up to leave. [laughs] So I didn't get to finish my report, but when we got to Ghana I was able to finish it and get it typed up and mail it back.

But the answer to your question is, yes, you do have to write a report and try to summarize what you—the pluses and minuses. I didn't have much to say about polygamy, that was something they already knew.

Wilmot: [laughs] Right.

Bragg: But about my specific experience. The main misfortune was that my houseboy—we called them houseboys—had stole several hundred dollars from me, which was a lot of money.

Wilmot: Monday?

Bragg: Monday, yes. And it comes from the cultural difference. I'm sure it was his fault, but I didn't help any by being indifferent to the difference in the value of our money versus theirs. By this time the naira, rampant inflation is going on. I mentioned that the naira was worth about two dollars when I went the first time in '76. Now a naira is worth about ten cents! I don't remember exactly, anyway, it's cheap. So, you know, five or ten

naira would be nothing to me, but it would be significant to him. And I had a habit of leaving pocket cash around on the table.

And it turns out that Monday wasn't all that bright, and when I arrived and discovered he was almost illiterate, I offered to help him to read. He didn't take me up on that, which was kind of a clue that Monday was not that ambitious. I can remember, Lanre had said she had gotten this good Christian boy to be my servant. Well, it turned out the Christian boy turned out to be kind of lazy. I would come home sometimes and he wouldn't be there, or dinner was late, and finally I confronted him, "Look, do you want this job or not?" That kind of pepped him up a little bit, but then he began to steal. And at first I didn't really notice because with small amounts you're not sure. But if twenty or thirty naira disappear, then of course after a while you do begin to notice it.

So finally one day—once a month Lanre would come by and settle up the accounts with Monday. I didn't have anything to do with paying him, she paid him out of my money which she kept for me. I mentioned that it looked like something funny is going on with the money, and besides, Monday isn't all that reliable. So she comes by and confronts him, and he confesses that he has been pilfering. And that night we're going to attend a traditional Nigerian wedding, which are a lot of fun. The daughter of one of the officials of the university was getting married to some very promising young man, and so this was a big occasion. And again, we don't dress in Western dress; we dress Nigerian style.

Wilmot: Did you like that style of dress? Did you like wearing it?

Bragg: Well, you get used to it. You know, some of the styles are very comfortable, I mean, you're in a very hot climate, mind you. The long robes, incidentally, I don't understand how they do that, but actually they are really comfortable. You'd think you'd be sweaty as all get-out.

But at any rate, typically these events—well, it's worth describing, this one. The bride's parents are fairly well-to-do, so they have a fairly good-sized compound. It's not just a house; it's a walled enclosure with a house and grounds and stuff like that. And the wedding guests are assembled in a tent that is pitched outside, a very colorful circus-like tent with electric lights hung up and a PA system and all that. And the bride's parents, the bride's family, the women all have the same dress; the dresses are all the same material, same colors, same style and everything. Incidentally, if you remember the old Carmen Miranda way-out hats that she used to wear, those are right out of Africa. They make their hats out of—take a piece of cloth and tie a complicated knot, styles. So to be able to tie very complex structures is kind of an art that women learn.

But at any rate, in the bride's family, women are all dressed the same way. The men, I don't remember. But similarly with the groom. Well, coming up to the wedding a party compound of the grooms family comes proceeded by a drummer. Always you have a drummer announcing that somebody important is coming. And it's the bridegroom's party, his family is coming to see the bride, what she looks like. Not him, he's still back there, but they're coming, and they come to the gate. Meanwhile, the guy, the drummer with his talking drum—as I say, always accompanied by a drummer—and they come to the gate and they say, "Well, we're here, we want to see the bride." At first, the bride's family say, "Well, she's not here." It's a game. And they kind of woof at each other, finally they say, "Yes, well, wait a minute. Come on, we know she's here." "Yes, she is

here, but you are going to have to pay to see her.” So they have to fetch over some money. Meanwhile, music is going on. And so eventually they're allowed to go in and be seated on the bridegroom's side of the meeting hall, the tent where the wedding is going to take place. And finally with some more fanfare the groom is allowed to come in and take his seat in a throne-like affair, literally gold, painted gold. He is all dressed up.

There is a kind of mistress of ceremonies who is conducting all of this. These people are hired like MCs. Got a PA system, and they've got musicians who are playing music. And the basic notion of the whole thing is that each side is extolling the virtues of its own side. The bride's people are saying, “Our girl is beautiful, she's young, she's a great dancer, she has got all these desirable attributes,” [claps hands] and they get up and dance around and do their thing. And big ones and little ones, but all dressed the same way. And the little girls can get down and do that hooch just like the big ones. Better. [laughs] And the groom's people, “Yes, but my man is handsome, he's strong, rich, fearless, has got all these attributes.” And they get up and—[laughs]

So finally they go, “Well, listen, come on, let's get on with it, I want to see the merchandise now.” [laughs] “We want to see the cash on the barrel here. So where is the groom? Where is the bride?” So in comes an entourage with the veiled bride, who then—not the actual bride, depending on how much time you have and so on. Sometimes she's a counterfeit, which extends the jollities. But eventually the bride comes in, she's seated next to her groom. There's some more stuff that goes on, he has to prostrate himself before the bride's parents, it's the last time he'll ever do anything like that, [laughs] to gain her hand and whatnot. And I guess some words are said, and everybody dances and they feed. Well, I've been in one wedding not quite as grandiose like that myself, when Aladekomo's daughter was married.

But at any rate, it's getting a little bit tiresome after a while, it's rather lengthy, so I'm about ready to bed, and they know it's about over. So Lanre says, “Did you check to see—”, meanwhile I had taken most of my large bills, hundred-dollar bills to my place from her. She said, “Did you check to see if he had taken any of your big money?” We had done the thing earlier, and after he admitted stealing a little money. I said, “No.” She said, “Well, we'd better go right now and check, right now.” So it's now dark. And we go by my place, and I go into the closet where I keep my clothes and my money, and sure enough, it looked like at the time I remember six, seven hundred dollars, something like that was gone, it might have been more.

Wilmot: He left some, but took some.

Bragg: Yes.

Wilmot: Hmm, interesting.

Bragg: Now, at one time earlier I had counted money, and it looked like one or two had been gone, but I said, “Well, maybe I had made a mistake somewhere.” But this, now it's no mistake whatsoever. So I said, “No, money is missing, a lot of money is missing.” [clapping noise] “Stop right there.” Aladekomo knows the provost, who is the head of security on the campus. And the guy lives on the campus like not too far from where I'm living. So Lanre stays there with me, he jumps in the car, goes over and picks up the

provost, comes back with him. Monday meanwhile is back out in the boys' quarters taking a bath, a shower. I'm not sure what he's thinking about, but he's still there. So the provost doesn't waste any time, he's a big bruiser. He goes out, kicks Monday out of the shower, he's literally dripping wet, brings him out to the front of the house, or the porch, where the cars with headlights—it's dark. And proceeds to ask him did he take the money, and Monday is telling him no. And he hits him upside the head, "Whap!" "Come on Monday, where is the money?" And after a while Monday says yes, he did take the money. [laughs] It's a very effective form of interrogation.

It turns out that Monday had been stealing money all along. And the boys' quarters are maybe twenty yards or so behind mine, so it's out of earshot. If they are quiet, reasonably quiet back there I won't hear it, and I never took it as my place to interfere with his life. That's where he lived, and that's fine. So I paid no attention to what went on back there. He would have visitors, occasionally somebody might make a mistake, come to my door looking for him, and I didn't like that particularly, but I didn't make an issue out of it.

Well, it turned out that Monday had been pilfering money right along and buying things in the store that you couldn't buy in the market—what were not indigenous foods, canned goods, which are very expensive comparatively, stuff that he couldn't afford. Designer jeans, which he couldn't afford. And one thing led to another, it turns out that he had given several chunks of money, hundred-dollar bills or something like that, to a photographer who he had hired on occasion to come here and take pictures of this revelry. I don't know any of this is going on! [laughs] All the neighbors know this is going on, but I don't. I'm not paying any attention to it! Well, you see, I'm the stranger and everybody's watching me and I'm not paying any attention.

Well, Monday is put in lock-up, and some of his boons, his friends are put in there too, mostly to frighten 'em, I guess. And some moneys are recovered. Some of the money was recovered when he had said that he had given this money to the photographer to keep for him. "Where does he live? Well, let's go, get in the car," take off and they encounter this guy coming back toward Monday's place with the money to get rid of it, because his wife says, "There's something wrong about this money. Where is Monday getting all this money?" And I wondered myself why didn't he ask the same question. Well, it turns out that the photographer at times had been kind of an undercover man working with campus police, so he wasn't totally clean himself.

Wilmot: So did you ever get to see the photos from this event? The revelry? [laughs]

Bragg: No. No, the bottom line was that after a while the chief of police, head of campus security said, "Look, you can bring suit in court if you want to about your money, but it won't do you any good, in fact it may be to your detriment. And the reason is that first of all, any loose sums of money like that, if anybody ever comes into contact with, even the guard, even the police, you may not see it."

Wilmot: It's gone.

Bragg: It's gone. "So you're not going to see the money, and you're going to tie yourself up going back and forth to court for no purpose whatsoever. So my recommendation is just forget it, don't bring charges."

Wilmot: I have kind of a larger question that relates to your trip at large to Nigeria. For you what was it like as an African American then to go and be there in Nigeria?

Bragg: It was a revelation because I realized that I'm not an African. I'm an African American, no question about that, but I'm not an African. Their culture is different. Well, for example, in going through, reading Nigerian history, I finally came to realize what I guess I knew all along, I don't think it was ever really suppressed totally. But there was a certain amount of collaboration between the Africans who were still there and the slavers who went there and bought the slaves. You see, the slavers didn't just go and take all of the slaves. What they did was to go to the coast and buy them. And people would actually go to war to get slaves to sell. Now, once you confront that, I mean, that hits you in the gut. Because all along I've been thinking, "My God, white people have gone over there and just sapped up everything." And over time, of course, things got so bad that they were able literally to control them. But initially, at the height of the slave trade until Africa was carved up around 1890 or thereabouts, African slavery is over, after the slave trade was gone. But prior to that, there was an enormous amount of collusion between the African leaders and the slavers. So it caused you to really rethink the whole thing about how pure Africa is with respect to the issue of slavery.

Now, in talking with the Nigerian group who addressed this subject, first of all, it was so old they didn't really want to talk about it, it wasn't a big deal with them. But they pointed out that many of them had—that slavery wasn't that big of a deal in Africa, and that slaves were often heads of armies, and one guy, his mother had been a slave, and it didn't carry the taint and the built-in perpetual status that, the denigrated status that American slavery did. So probably the people who were selling slaves had no idea of the fate of the people that they sold. So one has to back off and think a little bit about the cultural context. But the mere existence of the complicity in the slave trade on the part of the chiefs and the obas and whatnot was a revelation that just hit me in the gut. It took me a long time to come to grips with that.

I'd make note, even things like how you would fare in terms of your faculty advancement at Ife, which is in Yoruba country, if you are Ibo. There were Ibos there, but they caught the ass end of the stick, and the basically didn't do as well, because they were Ibos. That's right! If they were Hausas, that would be another thing. So tribalism everywhere. You'd be in a faculty meeting and a big argument would break out, what is this all about? Well, it turns out that this guy was challenged on some misstatement that was trivial, but by some other guy who happened to be a different tribe. So all of that is in there, you see. I'd say that everybody ought to have to go spend some time in Africa, to get their heads on right before they decide on how things ought to go. Because it ain't that simple, let's put it that way. And every time I hear talk about democracy I realize that tribalism is so ingrained that I have very serious doubts about how democracy is going to evolve when you've got artificial boundaries between countries—within countries. And if you found out that you don't have something like equal opportunity—you have that to some extent, but by and large it's as one of the employers of this brewery mentioned, the first thing that the guys want to know about an employee was not what he could do, but what family he came from. So with tribalism being so important, to superimpose our democratic ideals on that, it's going to be—it's not an easy thing to do. And every one of them will talk about democracy, but they mean different things. The word doesn't mean the same thing to them as it means to us.

Wilmot: You mean going back to Africa is not that simple?

Bragg: Certainly not. If you think you're going to go back to do anything in Africa—there's been a big push to go to South Africa, for example. Maybe that's a good idea, but there are Americans who did go to—I met, for example in Ghana I met an American guy who had taken his retirement from GE and gone to Ghana, when Ghana first got its independence. And he was if not an electrical engineer, he knew that electrical field. And he had saved up some money. And it's like a boom town, you know, things are booming. They've got their independence, and Nkrumah is going to have a great big conference there in Accra. So they've got to have this big meeting hall to show the big progress that's being made. And they had hired a Russian firm or something like that to do the electrical wiring. And it wasn't panning out. So he was able to bid on this job and get it done, and that was a big success for him. And he wound up then eventually with an electrical manufacturing business, and they expanded into two or three other related areas. Carlos Allston was his name. So I met him. He had turned out to be very successful.

But in general, well, it's a mixed bag. He sent his daughters back to the States to go to school, incidentally, to go to college. I met another guy, a dentist, who had gone there before that and decided that he was not going to carry two passports. He cast his lot with the Ghanaians and so he renounced his U.S. citizenship and became a Ghanaian. He made money, of course; he did very well. His son wound up in the Ghanaian air force—this is another story but—had flown a wreath over Du Bois' grave there or something like that. Well, I'm rambling, but the upshot of the whole thing was that visiting in Africa for extended periods of time I would certainly recommend.

Wilmot: To?

Bragg: Anybody who wants to have sensible notions about how to deal with issues involving Africa and our interaction with Africa, both as African Americans with Africans, and Americans with Africans. And what you will find is that the man in the street doesn't understand "brother man" language. It doesn't mean anything to them.

Wilmot: The man in the street in Nigeria?

Bragg: Yes. If you were a slave, well, you know, slaves you lost. On top of that, he doesn't see the connection, if you say, "You're my brother." But he doesn't see you as his brother, he sees you as a foreigner, that he calls you. In Nigeria they say call them Europeans. And that just meant anybody who wasn't Nigerian.

And I'm going to tell you a story about the haircut that I—one time I went to a barber shop to get a haircut. I had been going—

Wilmot: This was in Nigeria?

Bragg: Yes, in Nigeria, in Ife, down the main road, there are just, you know, shops there. And there was a pharmacy there that I had traded with, and this pharmacist had been to school somewhere in the States, he was kind of hip. So we would talk about the States, and he was very congenial, so, "Look, I've got to get a haircut, where do I go?" He said, "I think you ought to go to this one down there, don't go to the one I go to, that's a little

nicer. It's a nice haircut, nice barbershop." So I go there, it's a clean place, has a sign posted, haircut, shave, and whatnot. And looked—a clean place. So I went to get a haircut, which was like ten naira. And I don't know why I paid before the cut was finished. It might have been told it was ten naira, so I gave the barber twenty naira because I didn't have a ten-naira bill. Well, the cut was—the guy did a pretty good job. Meantime, the guy who owned the shop came in before my cut was finished. And so when the haircut was finished I took a look, it looked good, so my plan was to tip the barber. So I asked for my change. So the owner says, "You don't get any change." I said, "Why is that?" He said, "You're a white man." "White!?" "Yes." Of course, I was lighter skinned than him, but I wasn't that much lighter. [laughs] Nobody here would ever say that to me. And also there were Nigerians who were just as light-skinned as I was, so it wasn't that. But what he meant more or less was that, "You're from out of the country, you're a foreigner," and basically foreigners were white—

Wilmot: And have privilege.

Bragg: —And so you're one to be, essentially, cheated. So it didn't matter, "brother man" my eye! He never did give the money. I said, "Well, look, I was going to give this barber that ten naira, barber, your ten naira is right there. As far as I'm concerned, he owes me ten naira." So my point was that this—and it's not just African, any of these cultures, it would be the same thing. If I went to Mexico they would cheat me, they would cheat anybody who is not from there. So that wasn't new.

Wilmot: Yes, I understand that.

Bragg: Yes. But you just find it is a little bit ironic that your brother is cheating you. [laughs]

Wilmot: Yes. A different understanding of race and brotherhood.

Bragg: Yes. Brother had nothing to do with it. [laughs]

Wilmot: Now we could turn to your time at the Advanced Photon Society?

Bragg: Source.

Wilmot: Source. How can I mangle that name so many different ways?

Bragg: Well, it's just some words to you, but in the physics community APS could mean either American Physical Society, which is a common abbreviation, but in the subset of physicists APS also means Advanced Photon Source. And what that is within the confines of the Argonne National Laboratory which is outside of suburban Illinois, a suburb of Chicago, a third-generation synchrotron radiation facility was built several years ago. The first one was—historically probably at GE—but the one that had gained promise in the government laboratory situation was at Stanford. And the idea is simply that if you have charged particles moving very fast, they radiate electric waves. And the faster they move, the faster they are accelerated, not move, but accelerate—accelerate means that you don't go at a steady rate but you're constantly going faster—and things that move in a circle are always being accelerated, it turns out—so if you get them going around in a ring real fast, the radiation that comes out, some of it is x-rays. And so

it turns out that these x-rays can be very harmful and can kill you. So you have to make shielding for that.

Well, the Stanford Linear Accelerator, it was decided—and I forget how this came about, but as an add-on, after it had been operating for some time, a two-mile long accelerator at Stanford, which has been there for thirty years now probably—to send some of these electrons that they generate around in a ring, with proper shielding and everything. And then, instead of using this as a nuisance, use it as a source of high energy x-rays. Now what used to be a problem now becomes a solution or an advantage. So that's SSRL, Stanford Center of Synchrotron Radiation Laboratory.

Now, there are some in Brookhaven, there are a number around the country and in Europe and whatnot. And the one at Argonne was the third generation. In other words, every time you built—the first one, you learn some things. Now you incorporate these ideas in the next design. Now the third one, by the time you get around to that, it's the third generation. This one is about almost more than half a mile around, so it's quite a hike just to go around it. Built from scratch.

And the way it works is that in order to get x-rays, you have got electrons running around in a tube, and every so often you have a hole cut in the tube to let x-rays out. I'm over-simplifying it, but basically you've got a bunch of holes around there, and these things will come out in a beam, like, like a shining light through, in fact they call it the Advanced Photon Source. These beam lines then can be used to hang experiments on whereas—you might have in your dentist's, you might have an x-ray source, you put that thing right to your jaw and shine x-rays through your tooth. Well, the x-rays that shoot out of that is what does it. So imagine a thing that's a mile long that's got x-rays coming out that will go through several inches of steel. This is what it's like.

I was there because these things are—being that big around, there's lot of room to hang experiments.

Wilmot: When were you there?

Bragg: I guess it was '99, I guess.

Wilmot: Okay. What were you focused on while you were there?

Bragg: I was working with one group. There were different—a number of beam lines, which are at each hole, you might say, as x-rays are coming out of it, and around this one is built a little building with proper shielding where groups would use that particular source to do the experiments. In the management of this thing, they call these CAT—Collaborator Access Teams, something like that, CATs. And this particular one that I was working on was a consortium of University of Michigan, Howard University, and AT&T [American Telephone and Telegraph]. And it had come about because the particular senior investigators from these groups knew each other, and had gone together to write a proposal to fund the operation of this particular source.

Wilmot: And they knew you.

Bragg: Well, I knew Walter Lowe. I didn't know the others, but Walter Lowe, because Lowe was the only other guy besides myself that I knew of who had done a significant amount of work with x-rays, black guy. He comes later, of course, but he knew who I was, I had met him. And he hired me to work there for six months, to learn something about how to do it, and to essentially be a part of his program. And I managed to do some research on carbon materials again, write a couple of papers that got hung up for a reason that I won't go into. But basically it was a new direction in how to do x-ray studies that brought me into contact with that source. But also had brought me into contact with a better look at the—

[interview interruption]

Wilmot: I'm sorry, you were saying?

Bragg: Well, I was just saying—I said it brought me into contact with Walter Lowe, but more exactly, Walter Lowe brought me into contact with the CAT. And the reason was that I had been at a meeting of the National Society of Black Physicists, and a couple of guys I overheard talking about something to do with x-ray diffraction that were so knowledgeable I said, "Now, the only guy I ever heard of who is black who would know that would be Walter Lowe." Because I had heard he was at Howard. And so I actually asked him that, "Are you Walter Lowe?" "Yes, and are you Robert Bragg?" So one thing led to another, he said, "Why don't you come and work with us for about six months." So that's how [laughs] I happened to go over APS for six months.

And he had insights into so many things, new developments that were unknown to me. You see, from the time that I went to work at Lockheed where I became a materials scientist rather than a physicist, if it's possible to make that distinction, I had lost—I had stopped going to meetings of the American Physical Society. And the reason was that the work I was doing was much more specialized, oriented towards metallurgy and ceramics, and although the solid state physics would still be applicable, they weren't doing much in carbon materials or things that I was interested in. So a period of, say from 1961, for a good twenty-five or thirty years, I didn't go to meetings of the American Physical Society. Well, that's time for a whole generation of black physicists to come along, and they had. So now we've got a bunch of young guys who've all got fifteen to twenty years of experience I'd never heard of. And they'd never heard of me, because we're in disparate fields. Well, Walter of course is in touch with this generation because he's part of it. He's got plenty of experience, got his Ph.D. at Stanford, he spent ten or so years or more at the Bell Labs doing forefront research, and he's been at Howard for another eight or ten years by now, so he has got scads of experience, and there are a number quite like him, maybe, it's not hordes, but a much bigger number than ever before existed in my generation, that were my age. Warren Henry was probably—I guess you could count on one hand the number of black physicists my age who had got Ph.D.s. I'm sure you could. So it was nice to see all these young guys coming along that I had no idea who they were and they didn't have any idea who I was. And so I learned a lot about the current state. That was all so very beneficial. So it got me going again.

His grant ran out. It turned out that some of the ideas he had—he was very effective in getting the beam line up and going—he was not as effective in getting a lot of research of the caliber he was interested going. And the reason was that the production of

quality—in fact, let's take that back. The production of blacks at the Ph.D. level doing forefront research that would involve that kind of facility is abysmally small. He had a map on the wall of his office that had pins everywhere in the country where there were blacks doing anything in physics. It didn't matter whether it was x-rays, just Ph.D.s. It was just very depressing. So he had hoped to be able to make that the black presence in the synchrotron radiation game, but it just wasn't panning out.

Wilmot: As few as there were, it was still so different from when you were coming up. Still such a contrast.

Bragg: Oh, yes, no question about it. Well, there was Walter with all that experience and running a multimillion-dollar project, unheard of in my generation. He had an interesting career, has still. He had been at the Bell Labs, and he was approached about joining the physics faculty at Howard University. And at that time the Hazel [O'Leary]—I forget what her last name was, but there was a black woman who was the head of the Department of Energy.

Wilmot: O'Leary?

Bragg: O'Leary, right. And she was not an outright beat the drums for black folks, but wherever she could hit a lick she did.

Wilmot: Yes, right. I like that way of expressing it.

Bragg: Well, that's—and I guess when this proposal that he wrote for this beam line came up, well, it came through the Department of Energy, and I'm not sure what she said, and I can't—nobody told me anything, but my guess is that she had some impact on making them at least inclined to seriously consider the proposal that he wrote. As I said, the beam lines that was put up there, he had been the guiding spirit, the get-to guy that got things done, now. The next step of implementation—I might add the guy was worked to death keeping everything going—it just didn't go very far. He wasn't being replicated enough, let's call it.

Wilmot: Okay. Is that all you'd like to say about that experience there?

Bragg: Yes. At the moment I enjoyed it and wish I could have done more probably. But at the time it just worked out that the follow-on didn't look that promising, so that ended around Christmastime of that year.

Wilmot: Okay. I guess for today the last thing I wanted to talk to you about is teaching at Merritt. When did you teach at Merritt?

Bragg: Well, I guess it was the next year.

Wilmot: In the year 2000?

Bragg: Yes, I think so.

Wilmot: How many credits did you teach?

Bragg: Five.

Wilmot: So you taught a full course load. Your version of retirement is not quite is not quite easy.

Bragg: Well, you wanted to know why did I do that.

Wilmot: Yes.

Bragg: Well, oddly enough, I had never had the experience of teaching a course labeled "physics," except as a graduate student I did do labs, you know, undergraduate labs. But doing lectures and all that, I had never had that experience. Nor had I had the experience of having any significant number of black students in the class. The whole time I was at Berkeley I think I must have had—well, in E45, I taught that two or three times—I had maybe three or four. That's the undergraduate college-wide course I might have mentioned that all engineering students had to take, so that told you how many engineering students were coming through there because we would have to see all of them. But then it got to the upper division, junior and senior, those are the ones who are majoring in your discipline, and I think I had only maybe two or three the whole time I was in Berkeley. One of them incidentally got a Rhodes scholarship, got a Ph.D. at Oxford.

Wilmot: Who was this?

Bragg: Michelle de Cateau. She was one of the brightest students I ever had, too. So the idea of being able to teach some black students as a unique experience was attractive to me. And Merritt, I was told—well, there was Laney, and there was Merritt, and there was College of Alameda, and of those Merritt was supposed to have the more demanding academic standards. And on top of that, the dean of instruction happened to be a friend of mine who had often said, "Why don't you come and teach a course with us sometime?" So this time it turned out that somebody had died or there was some reason why it made sense; it did not require any radical change for me to go there. So I taught the first semester of the sophomore physics course at Merritt, and it turned out that the wish I had about the number of black students was only partially realized. I did have some, but I had just as many white ones as black ones. And I found that by and large, maybe not too surprisingly, the level of preparation of the students was not as high as at Berkeley, and also the work ethic wasn't as uniformly high.

Wilmot: And it was your first kind of foray into teaching at a community college.

Bragg: Yes.

Wilmot: Yes. And teaching physics.

Bragg: Understand now, I went to a community college myself, I told you way back there. It wasn't that I had any false notions.

Wilmot: I know you did, I was thinking about this as you told me that.

Bragg: But the difference is, at that time community college itself was still an uncommon source. Now it's very common. Anybody who wants to go—and they're all over the

place. So I guess what had happened was that it represented more of an advancement then than it does now. That's the only way I can rationalize the difference in the work ethic. Because I found, oh God, some people turning in reports on scraps of paper, it's like, "Get out of here! You can't—what is this?" And of course, I'm not sure I endeared myself to those students, but it was an interesting experience.

Wilmot: Well, should we close there for now?

Bragg: Yes, I think it's a good place to stop. I'll just put my tools down.

Wilmot: Okay.

[end of interview]

Nadine Erika Wilmot

Nadine Wilmot has worked in oral history for the past 7 years and has been with the Regional Oral History for three years. She began to use orality to explore race, place, and power while directing the Oakland Oral History Project as a graduate student at UC Berkeley. Since then, she has worked in documentary film and with community based arts organizations. Nadine holds a Masters in City and Regional Planning from UC Berkeley and a BA in African American Studies from Wesleyan University. She is from Oakland.

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